BALCOTE*

means NEW BINOCULAR PERFORMANCE

Why is Balcote* called the most spectacular advantage of postwar Bausch & Lomb Binoculars? Because now you see details you never could get with uncoated glasses. Afield, at the stadium, on the water, or in shadowy forest, revealing detail is brought out in sharp contrast. Write now for information on this new line of binoculars—"*the world's best—by any test.*" Bausch & Lomb Optical Company, 286 Lomb Park, Rochester 2, N.Y.

**Balcote is the Bausch & Lomb anti-reflection coating—four-millionths of an inch thick—used on all air-to-glass surfaces (20 such surfaces on the model shown above) of the binocular's precision optical system. It cuts light loss as much as 50%, prevents flare, increases image contrast.*

BAUSCH & LOMB

ESTABLISHED 1853

Science Library

Audubon MAGAZINE

(formerly BIRD-LORE)

A BIMONTHLY MAGAZINE DEVOTED TO THE PROTECTION AND PRESERVATION OF OUR NATIVE WILDLIFE

AUDUBON MAGAZINE is published bimonthly by the National Audubon Society in two editions. Subscription price for National Edition (published in one section) $2.00 per year for the U.S.A., $2.25 foreign. Single copies 35 cents each. Subscription price for the Regular Edition (published in two sections) $3.00 per year in the U.S.A., foreign $3.25. Extra copies of Section II of the Regular Edition may be had at 15 cents per copy for the reports on Fall Migration, Winter Season, Spring Migration and Nesting Season; 25 cents for Breeding Bird Census; 40 cents for Christmas Bird Count. Notice of change of address should be received five weeks prior to issue with which it is to be effective.

AUDUBON MAGAZINE regrets that it cannot continue subscriptions beyond date of expiration. Checks and money orders should be made payable to AUDUBON MAGAZINE. Editorial and advertising offices, 1000 Fifth Avenue, New York 28, N. Y. Reentered as second-class matter April 29, 1942 at the Post Office at New York, N. Y., under the Act of March 3, 1879.

Copyright, 1946 by the National Audubon Society.

Postmaster: If undeliverable, please notify Audubon Magazine on form 3578 at 1000 Fifth Avenue, N. Y. 28, N. Y.

DIRECTORS OF NATIONAL AUDUBON SOCIETY: Charles C. Adams, Roger Baldwin, G. Lister Carlisle, Mrs. Francis B. Crowninshield, Gayer G. Dominick, Aubrey Drury, Guy Emerson, Ludlow Griscom, John Kieran, Mrs. Paul Moore, J. J. Murray, Mrs. Walter W. Naumburg, E. Laurence Palmer, Carll Tucker, William E. Wrather.

OFFICERS: Robert C. Murphy, *Honorary President*, Ludlow Griscom, *Chairman of the Board*, G. Lister Carlisle, *Chairman, Executive Committee*, John H. Baker, *President*, Carl W. Buchheister, *Vice-President*, J. J. Murray, *Secretary*, Helen Peterson, *Assistant Secretary*, Guy Emerson, *Treasurer*, Irving Benjamin, *Assistant Treasurer*.

MEMBERSHIP in the National Audubon Society helps to support the cause of protection and conservation of wildlife, plants, soil and water which result in improved public health, greater public happiness, better public economic welfare and higher standards of living.

- Regular ..... $ 5
- Sustaining 10
- Active 25
- Supporting 50
- Contributing 100
- Life 200

In this issue

VOL. XLVIII, NO. 3

JULY-AUGUST 1946

KEEPING UP WITH THE WATERFOWL
By Frederick C. Lincoln 194

WESTERN HABITATS
By Hustace H. Poor 207

THE LITTLE FOX
By Grace Curry 212

SAINTS AND NATURE
By Alan Devoe 216

WHERE FOREST AND PRAIRIE MEET
By Maurice Brooks 220

ON THE TRAIL OF CONGO JIM
By John K. Terres 230

THE PRESIDENT'S REPORT TO YOU
By John H. Baker 239

BIRDING IS A SPORT
By Bartlett Hendricks 246

THE NATURE OF THINGS
By Richard H. Pough 248

THE CHANGING SEASONS
By Ludlow Griscom 250

LETTERS TO THE EDITOR 252

THE COVER:
GREAT BLACK-BACKED GULL
By Eliot F. Porter

EDITOR
Eleanor Anthony King

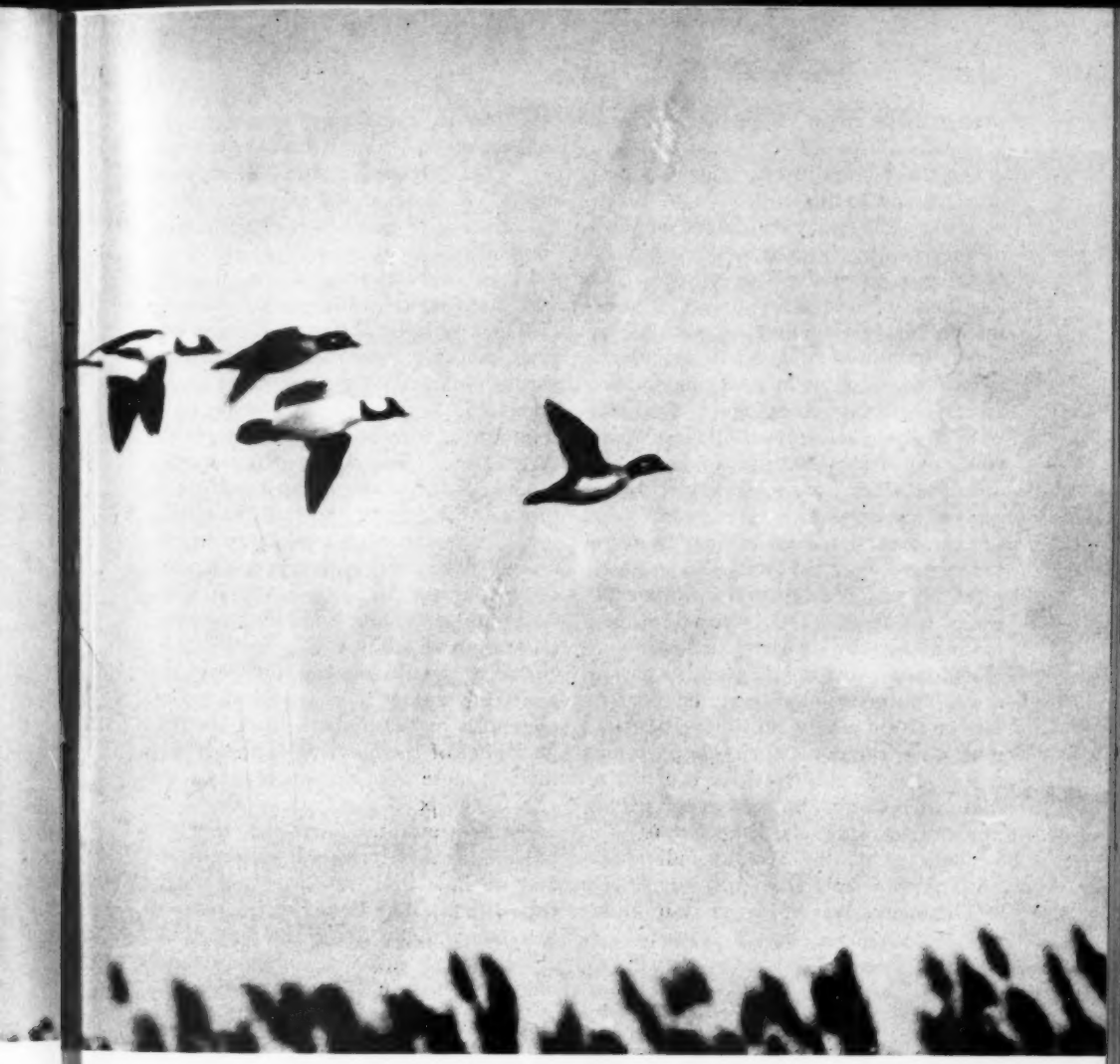
CONTRIBUTING EDITORS
Arthur A. Allen • Henry Beston • Alan Devoe • Ludlow Griscom • Louis J. Halle, Jr. • Margaret Brooks Hickey • John Kieran Aldo Leopold • Robert Cushman Murphy Donald Culross Peattie • Roger Tory Peterson • Herbert Ravenel Sass • George Miksch Sutton • Edwin Way Teale

Keeping Up with the Waterfowl

Editor's Note: **For the past two seasons, our waterfowl have been on the decline. To all those who remember the "duck depression" of the early thirties, this is a warning.**

When weather and other environmental conditions go against the birds we must play safe by drastically cutting back the hunting pressure from the peak it reaches during an upswing of the population cycle. The kind and amount of hunting pressure that waterfowl can survive will always be a matter of controversy. But the degree of this difference of opinion should become less as the public knows more facts. Therefore, we have asked Dr. Lincoln, Biologist in Charge, Distribution and Migration of Birds of the Fish and Wildlife Service, to write this article which will help all of us gain perspective on the waterfowl situation. **See page 239 for further discussion of this subject.**

Allan D. Cruickshank



By Frederick C. Lincoln

HOW many ducks and geese are there in North America? We don't know, we can only estimate.

But estimates do help us answer the important question: Are there enough? The actual *number* makes little difference as long as there are *enough*. When estimates reveal that the numbers are declining, every effort must be made to protect the next season's breeding stock.

Each year the Fish and Wildlife Service makes a population estimate to find out if there is a trend up or down. Finding the practical answer involves keeping up with the waterfowl over a vast territory stretching from the Arctic to the Tropics.

Information is gathered from four principal sources. From observers who estimate the percentage of birds moving north and south each year; from the reports of the Service field personnel; from a check-count in the wintering grounds after the hunting season; and

from records compiled on the recovery of banded birds.

For many years investigation was confined chiefly to the collection of observations on the spring and fall movements of all migrating birds made by volunteer observers who received no compensation for their services other than the satisfaction of assisting in a program of research sponsored by the federal government. Some of them have maintained an almost unbroken sequence of reports from a single station, and their twice-a-year observations constitute a local record of much ornithological value.

As study became more and more concentrated on game birds, it was necessary to add a second group of about 700 observers who were located in important waterfowl areas. This group is chosen to meet certain standard requirements. They must know the different species of ducks and geese; they must be as accurate as is humanly possible; and they must be without bias toward sportsman or bird-lover. If any evidence of prejudice is discovered in their reports, they are dropped from the list. No attempt is made to "reform" such an individual; he is simply replaced.

These observers report, not in numbers, but in estimated percentages, the increase or decrease of the different species. They report that the birds of each species are more or less numerous by so much per cent as compared with their observations on the same species during the previous comparable flight.

Reports are critically examined by the Fish and Wildlife Service and fitted into place as the waterfowl jig-saw puzzle is gradually put together. If reports are exaggerated, the fallacy usually shows up in comparison with other reports from the same area. One sportsman reported 250,000 ducks wintering on his property in a southern state. Yet a flyway biologist, with many years experience in estimating waterfowl concentrations, had flown over the property at low altitudes on several occasions, and never reported more than 18,000.

During the migrating, breeding and wintering seasons there is a constant flow of reports to Washington from the field personnel of the Service. These reports include those from the four flyway biologists who spend their summers on the breeding grounds. There they check on breeding conditions, water conditions, and on how well the birds are rearing their broods. The Canadian government has men who are doing the same thing. A reciprocal exchange of reports provides each nation with information.

When the waterfowl are settled in their winter quarters and the hunting season is over, the Service is ready for its annual January inventory, the culmination of its annual investigations. By this operation, in which as many as 2000 men may participate, an attempt is made to obtain a numerical estimate of the ducks and geese that are available to start the annual cycle again.

The five regional directors (the country as a whole is divided into five regions for administrative purposes) supervise the inventory, while the actual field work is directed by 70 game-management agents. Each agent is responsible for the inventory in his district, which may be

Shoveller by Lorene Squire

an entire state. The largest and most important waterfowl states are cut up into two or three districts.

The agent makes his own estimate on the important concentration areas, checking by observations from the air, ground and water. So that other areas will be covered simultaneously, he enlists the aid of a corps of such trained observers as biologists, refuge managers, district agents and other Service field personnel, state game wardens, the police, officers of the National Park Service, Forest Service, Soil Conservation Service, colleges, universities and other agencies.

A whole navy of boats from the Service, and the state game departments participate in this operation. Double coverage of all important areas is assured by the use of aircraft of several types belonging to the Service, the Coast Guard, the Naval Air Service and the Army Air Forces. These range from the light fast planes of the pursuit type, to heavy bombers, autogyros and blimps.

Standard instruction and report forms are furnished all those helping to estimate the birds. The formula for estimating the number allows for one duck per square yard. Since it is obvious that no raft of ducks is actually a parallelogram, but instead, that it tapers off at the ends and has open spaces in the general mass, we always subtract one-third from the original figure. We have used this formula since 1935, and it was worked out by the writer some fifteen years ago on Crane Lake in Illinois. It has been tested several times by aerial photography and the actual count on the pictures has shown that the estimate by eye is close. An observer's accuracy depends entirely upon his ability to estimate distances, not an easy task over water.

All reports are carefully studied for probable error by the game management agent. Then he makes his report and forwards it to the regional office, where a team, composed of the regional director and his assistant, the supervisor of law enforcement, the regional biologist and frequently one of the flyway biologists, reviews the information.

When the five regional reports are received in Washington, they are compared, along with data from Canada and, when obtainable, from Mexico and other countries to the south, and thus form the basis for the estimate of continental waterfowl population available to restock the breeding grounds.

Back in 1935, when this work was first undertaken, it was obvious that full coverage was not possible so consultation was had with the regional directors and others to determine the probable accuracy of the tabulated figures. It was decided that for various reasons, the total estimates made by the observers probably did not represent more than 25 per cent of the actual populations. Accordingly, in order to arrive at the estimate for the continental population of ducks and geese, the tabulated totals have been multiplied by four. Possibly 3 or even 5 should have been used, but since 4 has been consistently employed, the figures announced each year do show the current trends with reasonable accuracy.

Criticism has been made that this is only an estimate and not a "census." The Service has never claimed that it was more than that. But an estimate made at the same time, in the same areas, by the same qualified observers year after year, does reveal population trends of real value. It makes little difference whether the totals reported by any one observer are 25 per cent low or 25 per cent high, if he has consistently made the same error in previous years his figures are comparable and show the proportional upward or downward trends of the different species. As an aid to the practical management of a great migratory resource, this operation has proved its value.

Today with these comparative records as a guide to the up and down trend in populations, and with our refuge system well under way, we should be in a position to avoid a repetition of those dark

↑ **Breeding Grounds of North American Waterfowl.**

↓ **Wintering Grounds of North American Waterfowl.**

The shading in this breeding map is continuous but that does not mean that waterfowl occupy every acre. It does mean that every marsh and lake may serve as a breeding ground according to its facilities of food and cover, and where there is no disturbance by man.

The vast breeding grounds north of the agricultural zone in Canada, or "north of the bush," includes districts in northern Saskatchewan, and Alberta, particularly in the vast region of Lake Athabaska, and in the valley of the Mackenzie River all the way to its delta on the Arctic coast. They can contribute a great flight of birds if we permit breeders to go back to them. This is also true of Alaska where the huge valleys, flats and deltas of the Yukon, Kuskokwim, Tanana and other rivers undoubtedly produce most of the ducks and geese of the Pacific flyway.

---

days of the thirties when ducks and geese seemed to be proceeding toward the vanishing point. We have learned much from experience, we have improved our fact-finding techniques and increased our supply of facts. While the drought that has prevailed in some portions of the breeding territory during the past two years may not be the beginning

---

Winter refuges on the south Atlantic coast, lower Mississippi Valley and Gulf coasts are of vital importance since almost all the birds of the Atlantic and Mississippi flyways winter within our borders.

The high quality of these wintering resorts have been impaired locally by the drainage of marshes and the dredging of the inland waterway which, by altering salinities, has reduced the value of vast areas for waterfowl.

Many of the winter concentrations of birds of the Central and Pacific flyways are in Mexican regions—in the east, on Laguna Madre and Tamiahua Lagoon; in the west, in the valley of the Yaqui, Mayo, Fuerte, Sinaloa and other rivers, and on Lakes Chapala, Patzcuaro and Cuitzeo.

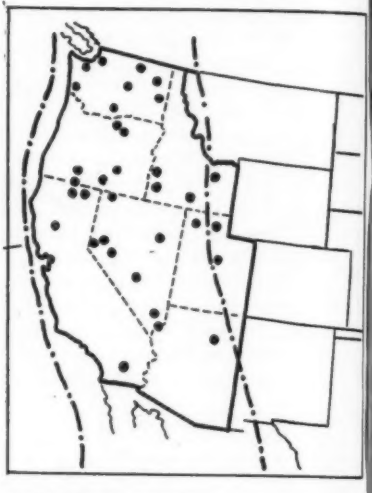
of a cycle of weather and other environmental conditions as unfavorable as that of the early thirties, it is nevertheless a warning to be heeded.

Today the movements of North American waterfowl are better known than those of any other continent, and the research which has contributed to this knowledge dates back 61 years to the time when the first government agency was formed to study birds. Since July 1, 1885, when the first small appropriation became available, knowledge has steadily advanced. In 1918, with the passage of the Migratory Bird Treaty Act, Congress gave recognition to the national and international character of the problems concerning migratory birds. To meet the obligations of the treaties with Great Britain and Mexico, the administration (as well as investigation) of migratory birds was put on a national basis. This included the authority to establish hunting seasons and other restrictions upon the taking of these birds of passage.

Our international commitment called for more information, if the birds were to receive adequate protection. A period of intensified investigation was ushered in. Bird-banding was expanded on a continental scale never before attempted. This work had begun in 1909, when the American Bird Banding Association was formed. In 1920, banding was taken over by the Biological Survey which was (in part) the predecessor of the Fish and Wildlife Service. In cooperation with Canada, all kinds of native birds were banded, but special attention was given to the waterfowl. Recovery of banded ducks and geese accumulated so rapidly that by 1930 it was possible to map out the four waterfowl flyways—great geographical regions, each with breeding and wintering grounds connected by a complicated series of migration routes.

It was discovered that the birds have a strong attachment for their ancestral flyways and by adhering more or less rigidly to any particular flyway, the ducks and geese tend to perpetuate not

Left: Birds in flight mark the principal migration routes taken by the waterfowl within each flyway system depicted.

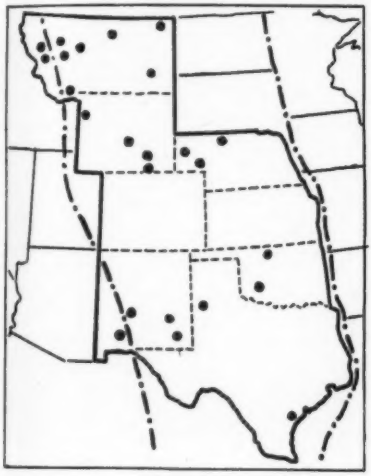


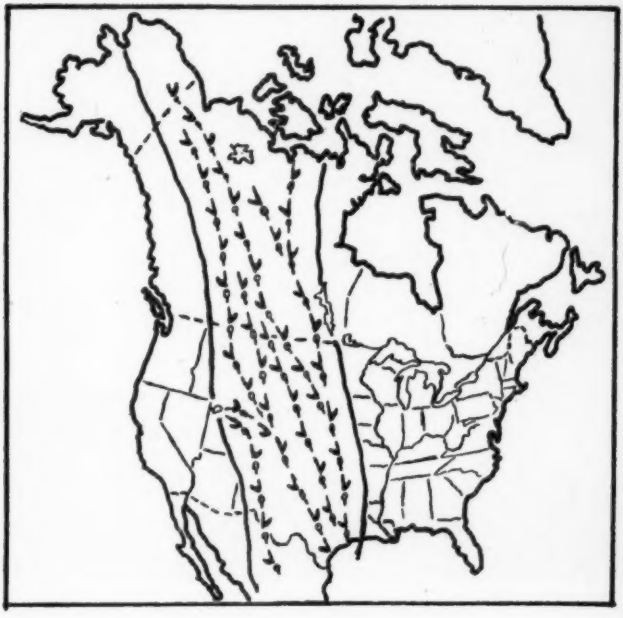
The Pacific flyway with its migration routes and refuge system.

The four great North American flyway systems are vast areas, each of which includes breeding grounds, wintering grounds, a complex series of migration routes, and its

The Mississippi flyway with its migration routes and refuge system.

Below: The large dots on the maps represent the principal migratory bird refuges within each flyway in the U. S.

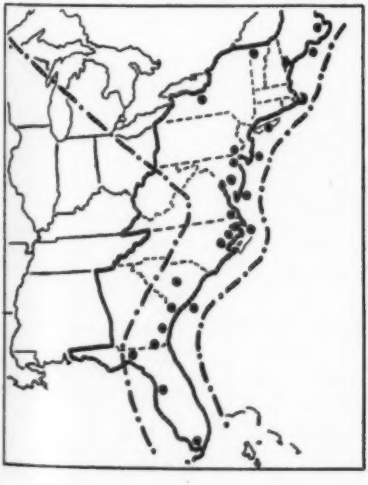




The Central flyway with its migration routes and refuge system.

own population of waterfowl. Their discovery resulted from bird-banding operations by American and Canadian naturalists working with the U.S. Fish and Wildlife Service.

The Atlantic flyway with its migration routes and refuge system.



Massed flight of migrating ducks, photographed by Allan D. Cruickshank.

only that ancestral route but also the groups of individuals that use it.

Recovered bands showed that there is little interchange between the flyways, even when a species has a more or less general continental distribution. On some parts of the Canadian breeding grounds the birds of two or more flyways may intermingle freely, but when the time comes for migration, they separate and each group follows its traditional route to its wintering ground.

Birds may be abundant in one flyway and not in another. Suppose that widespread drought conditions in the Great Plains and Prairie Provinces of Canada should greatly reduce the birds in the Central flyway. At the same time, the birds of the adjacent Pacific flyway that come chiefly from British Columbia and Alaska, would be unaffected.

On the other hand, within a single flyway, one group of birds may be abundant while another group might be drastically reduced. In the Atlantic flyway, for example, the waterfowl population is made up of two distinct groups—one from the interior, the other from breeding grounds more or less coastal. Among the coastal breeders, the northeastern flight of black ducks, ring-necks and Canada geese might be thriving; yet at the same time the canvas-backs, redheads and scaups could be scarce, should drought be prevailing on their breeding grounds in the Prairie Provinces of Canada.

Such knowledge is of inestimable value in the constant effort to keep up with all elements of the waterfowl population and to give them the protection that they need *when* they need it most. For without this knowledge, it would be possible for a species to be exterminated in a single flyway although it might be abundant in others. If a species were wiped out in any one flyway, it would at best be a long time before that region could be repopulated.

Discovery of the importance of the flyways came just prior to the expansion of the refuge system which took place in the early thirties. The waterfowl were in a desperate plight. How could the refuge system be expanded to secure the great-

est benefits in the shortest time? What were the most strategic locations? Which areas were to be marked for priority of purchase and development?

Our knowledge of the flyways yielded the answers. We knew that in normal times the Mississippi flyway held the heaviest populations. When it was plotted and mapped for refuges, I had the pleasure of personally handing this plan to the late President Roosevelt. Today, a well-connected chain of refuges dots this important flyway from Medicine Lake in northeastern Montana and Seney on the Upper Peninsula of Michigan, south to White River in Arkansas and Delta in Louisiana.

There is an interesting "now it can be told" phase to this Mississippi flyway program. As chairman of the committee, I was involved in the intra-Bureau discussions that took place over which areas were to receive priority of purchase. On all (or almost all) of the lists prepared by the committee, White River, Arkansas, was given No. 1 priority, although at that time no member of the committee had ever worked in the area. White River is at the bottleneck of the flyway, and the great number of banded ducks that has been reported each season from this point of concentration has supported our judgment.

Although great progress has been made in the past fifteen years, our refuge system is not yet complete. The most critical need is for more wintering grounds. This is true in all flyways, but in the West, it poses some particularly knotty problems, for there our waterfowl wintering grounds are also excellent agricultural lands. In the East, the main wintering quarters are, for the most part, away from crop areas. On the Atlantic coast, the birds flock to the coastal marshes from Long Island southward. With comparatively few exceptions, there is no great amount of agriculture near these coastal marshes.

But in the West, even when the water-

Pintail merry-go-round at a stopping off place enroute to the South, photographed by A. D. Cruickshank.

Green-winged teal by Lorene Squire

fowl population was at its lowest, there was a problem. As the birds increased, so did reports of depredations upon crops. Upon investigation, it has been found that some reports are based upon the desire of complainants to shoot birds out of season or even to shoot more birds during the open season without the necessity for observing the regulatory provisions as to bag limits. Some complaints, however, are genuine and suggest that we need more and better feeding areas distributed along the flyways, and additional improvements to the main wintering grounds.

The Skagit Flats in the state of Washington is a particular example. This coastal area lies due east of the southern tip of Vancouver Island and was once dairy country where prize herds of milk cattle were pastured. During the past 25 or 30 years, dairy production has gradually changed to the raising of cabbage and turnip seed. At the same time, a flock of widgeons that breed in Alaska, Yukon and British Columbia increased from 15,000 to 100,000 birds. Their ancestral winter home is in the Skagit Flats. Naturally, they are causing trouble for the farmers.

Farther south, in the old marshlands of the Sacramento, San Joaquin and Imperial Valleys of California, is the ancestral winter home of hundreds of thousands of pintails, mallards and other ducks and geese. These areas are now amid the most productive agricultural regions of the country. Marsh plants have given way to rice, barley, lettuce and other cultivated crops, and the waterfowl have proceeded to make free use of them.

In the Snake River Valley of Idaho, the development of irrigation has brought agriculture to another great wintering ground. In the cornfields of northeastern Colorado, wintering flocks are also in conflict with the farmer.

The only way to ultimately meet this problem is to develop additional feeding grounds in such areas. In California, it will be necessary to purchase and develop around 40,000 acres of submarginal land for duck-feeding areas in the Sacramento and San Joaquin valleys.

As has been said many times, the refuges are a life insurance system for the waterfowl. If hunting is carefully regulated, it is believed that even when weather and other conditions are unfavorable, no single flight of birds could be completely wiped out as long as the refuges are there to furnish food, water and a place to recuperate. And when populations are high, and shooting regulations are liberalized, refuges provide a safeguard against mistakes that might be made in over-liberalizing.

Our waterfowl will always need management by regulation, based upon continuous investigation. The American system of hunting is the envy of the world, but to maintain it requires the best possible information regarding the status of game and the factors that affect it. Field studies never can be relaxed. Hunting has been called "a billion dollar industry," but the money spent in learning how to administer it is pitifully small. Research must be expanded.

Keeping up with the waterfowl is a job of the first magnitude. But with the experience already gained there is no reason why the supply of ducks and geese should not be kept adequate for reasonable sport and other enjoyment.

CERTAIN species of waterfowl may be abundant on one flyway and endangered in another. Or within one flyway, a certain flight of birds may be in worse condition than others of the same species using the same flyway. This may be due to adverse conditions on the breeding or wintering grounds or both.

The Canada goose furnishes a specific example. The geese that winter at Horseshoe Lake, Illinois, have been declining for several years. Investigations, including an intensified banding program, revealed that the birds breed in a rather limited area west of James Bay in the Province of Ontario. Here during the spring and fall migrations they were subjected to a moderately heavy take by Indians who depended upon them for an important part of their food supply.

As the birds proceeded south in the autumn, they concentrated at the little Horseshoe Lake refuge owned by the State of Illinois and located at the southern tip of that state near the confluence of the Ohio and Mississippi Rivers. Because of its small size and the organized hunting on surrounding farm land, and for other reasons, it was possible for hunters to make very heavy kills.

A Canada goose honks a complaint from her nest in the James Bay region of Ontario.

H. H. Schroder

Paul J. Fair

Canada geese flying in formation toward their winter home.

The flock numbered 45,000 in 1940, but in 1945 the pre-hunting season size of the flock had been reduced to 26,000 birds. The flock was in no way endangered yet, but it was evident that drastic action must be taken to reduce the overshooting. Controls instituted by the Fish & Wildlife Service and by the Illinois Department of Conservation had failed to achieve the desired results, so on April 15, 1946, the Director of the Fish and Wildlife Service announced that "hunting wild geese in Alexander County in southern Illinois will not be permitted during the 1946-47 migratory waterfowl shooting season." It is hoped that this action will allow the flock to build up to its former strength, and that, in the meantime, ways will be found to provide the birds with a larger winter range and so disperse them over a greater area.

WESTERN HABITATS

The President of the Linnaean Society of New York presents a picture story of the land where climate is an up and down affair. Follow the trail from snowy heights of 12,000 feet to the sea-level deserts in Arizona. Observe the striking changes nature has made in environment at each level of elevation. Photographs are the author's unless otherwise credited.

By

Hustace H. Poor

IN no region of North America are the effects of physiography and climate on the distribution of vegetation and animal life more strikingly demonstrated than in the mountains of the southwestern United States. The height and steepness of the mountains provide wide variations of climatic conditions within a limited geographical area; the latitude permits these conditions to range from subtropical to subarctic; and the general aridity of the region gives particular importance to rainfall and ground water. These factors combine to present to the naturalist successions of abrupt changes in vegetation, and corresponding changes in animal life, which inspired C. H. Merriam's pioneer work on "life zones" at San Francisco Mountain in northern Arizona. Since Merriam's day the "life zone" concept has been found increasingly inadequate, and zoogeographers currently support several different schemes of ecological classification, none completely satisfactory, to correlate the various habitats and their associated animal populations. This article presents photographs of habitats in Arizona illustrating some of the great diversity obtaining in the southwestern mountain regions, the raw material from which zoogeographical theories are developed.

The upper reaches (10,000 to 12,000 feet altitude) of the highest mountains are covered with dense forests of spruce and fir, such as would be found at sea level 1500 miles farther north. Such boreal species as crossbills, red-breasted nuthatches, kinglets, creepers, and three-toed woodpeckers live here, as well as mountain chickadees, Steller's jays, and hermit thrushes.

Below the dense forest (9,000 feet) are extensive and rather dry grassland prairies which provide nesting areas for horned larks, meadowlarks, chipping sparrows, and vesper sparrows. The forest edge and occasional small clumps of trees furnish the desired habitats for sparrow hawks, mountain bluebirds, and robins. Streams transecting the area are often bordered with aspens, low willows, and rich grass which harbor warbling

The Saguaro by Josef Muench

vireos, orange-crowned warblers, and Lincoln's sparrows. Lakes provide breeding areas for sora rails, coots, ducks, grebes, spotted sandpipers, and killdeer.

Lower still (7,000 to 8,000 feet) are extensive and beautiful open forests of western yellow (*Ponderosa*) pine, with but little undergrowth. Here are found chestnut-backed and mountain bluebirds, Cassin's kingbirds, Mearns' and hairy woodpeckers, and black-eared nuthatches. Along the streams breed yellow-throats, goldfinches, *(S. psaltria)*, blue grosbeaks, and lazuli buntings.

In the 5,000 to 7,000 foot altitudes are dry, open forests of junipers and pinyons, and extensive parched grassland areas with varying amounts of cactus and yucca. Gray titmice, blackthroated gray warblers, pinyon and scrub *(Aphelocoma)* jays, mockingbirds, and shrikes are charactertistic of the juniper-pinyon association. Horned larks, meadowlarks, vesper, lark, and chipping sparrows are found in the open grassland and at the forest edge. Tules and rich grass along the edges of lakes harbor yellow-headed blackbirds and red-wings, killdeer are common along shorelines, and streambank willows and poplars provide nest sites for yellow warblers, long-tailed chats, yellow-throats, blue grosbeaks, lazuli buntings, goldfinches, and warbling vireos.

At the lowest elevations, below 3,000 feet, extreme desert conditions prevail, with vegetation consisting of cactus, mesquite, greasewood, and other desert plants. Roadrunners, verdins, thrashers, cactus wrens, and Texas nighthawks are found in the dry situations, with hooded orioles, vermilion flycatchers, and white-winged doves found near water.

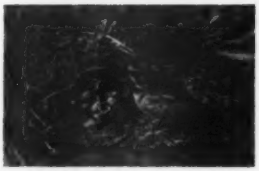
This brief survey can merely suggest the diversity of habitats originating from variations in altitude, rainfall, slope exposure, and soil characteristics. The study of plant and animal distribution and interrelation in this fascinating region will provide ecologists with intriguing problems for years to come.

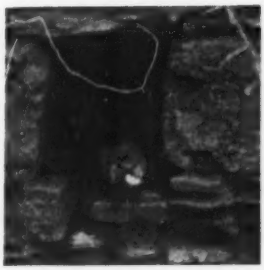
At the top of the opposite page—The top of Baldy Peak in the White Mountains of Arizona sets the high point in the ladder of climates and environments. The photograph shows the weathering effect on vegetation sharply demarked on these slopes by wind and exposure. Spruce and fir forest sparsely cover the balding heights of the range.

The 11,500 foot elevation gives little abode to any animal or bird but the small horned lark (nesting in grassy areas) and the rock wren (in the rocky out-croppings). These two, pictured at left on the opposite page, will nest anywhere from peak to desert level.

At right on the opposite page are the inhabitants of the 9,500 foot station in Arizona's White Mountains. The Lincoln's sparrow nests by the stream bed. The Brewer's blackbird finds dryer ground more agreeable.

Descending 2,000 feet to the next elevation you come to the forest-grassland junction. Here at 9,500 feet is a willow bordered stream flowing through dry grassland. This is the habitat of the orange-crowned warbler, Lincoln's sparrow and mallards nesting beside the streams. Red-backed juncos, green-tailed towhees and Brewer's blackbirds breed on the dryer hillsides.



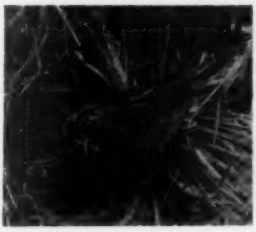


Above: Baldy Peak, White Mountains, Arizona. Altitude: 11,300 feet.

Left: A horned lark feeding its young (photograph by Brooke Manley) and a rock wren at its rock nest site below.

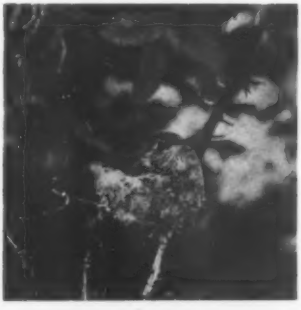
Right: Nest, eggs and young of the Brewer's blackbird nesting on the ground at 9500 feet, and a Lincoln sparrow (photograph by Alfred Bailey).

Below: Phelps Ranger Station, White Mountains, Arizona at 9500 feet.



Floating nest of a coot on Big Lake.

Top on the opposite page: 9,000 feet up in the White Mountains of Arizona. Coots and other waterfowl are the most abundant species on the lakes that begin to appear at this altitude.



Left: The broad-tailed humming bird on its nest 6,000 feet up in the Arizona mountains. This species will breed over a range of altitudes from 6,000 feet to the peaks.

On the opposite page at 5,000 feet: right shows the juniper-pinon forest - grassland junction at Fort Apache, White-river, Arizona; left, a pinon pine, favorite nesting site of the Cassin's kingbird.

Left: A Cassin's kingbird and its brood at the top of a pinon pine that grows to a twenty foot height.

Left: A cactus wren in the Saguaro National Monument of Arizona, photographed by Eliot F. Porter.

On the opposite page: Organ pipe cactus and Palo Verde in southern Arizona desert regions. Photographed by Josef Muench.

Left: The Arkansas kingbird nests in lower altitudes than the Cassin's kingbird it so closely resembles.

The Little Fox

Photograph by W. J. Schoonmaker

By Grace Curry

THE first time I saw Ike he was a pathetic little fellow peering out between the slats of a crate at a very strange new world. The office of the Cleveland Museum of Natural History was a far cry from a fox den and other baby foxes with which to play. He had been shipped to us as a pet for the summer at one of our Trailside Museums.

A tentative finger poked through the slats was greeted without enthusiasm. Gingerly I opened the crate, and a very cramped, hungry, lame baby fox, about six weeks old, emerged. We set him on his wobbly legs, and with great difficulty he limped around the floor.

We fed him ground dog food and milk, and next day one of the museum staff presented him with a bottle of cod-liver oil. In three days the lameness had entirely disappeared. Food, cod-liver oil, and exercise had apparently done the trick.

Thus Ike became one of a motley group of animals used as visual material in my museum classroom. In Cleveland the public school children are brought to the Museum of Natural History for lessons which correlate with their classroom science work. The live animals, mounted specimens, and museum exhibits augment the regular science teaching program. The other animals in the classroom were a sparrow hawk, two squirrels, five snakes of assorted sizes and varieties, three turtles, also assorted, three toads and some goldfish.

When the little fox was brought into the room there was an immediate reaction from the sparrow hawk. Molly let out her shrill call, and the squirrels scolded noisily from the top of their cage. The snakes and turtles, being unemotional, paid no attention to the intruder. The fox was not at all interested.

Ike arrived on V-E Day, hence his name. Though it was doubtful whether he would ever live up to his illustrious namesake, General Ike, the newcomer had "winning ways" and drew a stream of visitors. Since the advent of Ike, I seemed to be holding a constant reception. A colleague explained my sudden popularity as "fox appeal!"

I gave Ike as much freedom as pos-

sible. He followed at my heels most of the time, letting out friendly little noises and occasionally nipping at my stockings. When I left the room he would sit at the door and whine until I returned.

After being shut up in his cage all night he was lonesome and tired of confinement. In response to my morning greeting he would climb up the side of the cage, and if I didn't let him out immediately, he would start to bawl in no uncertain terms, like a baby who had worked itself up into a tantrum to get its own way. When I opened the cage, he let out happy little squeaks and barks and jumped around at my feet like a puppy. At times it was hard to realize that he was not one; but his alertness for the least sound or sudden movement, his wariness of strangers, proved that the wild instinct remained strong. He was always more natural and interesting when alone with me.

During the spring and summer Ike's development and growth were rapid, and like any young creature he acquired new abilities daily. His most outstanding traits were his intense curiosity and his love of fun.

He seemed to think that cleaning his cage and wiping up the inevitable spots on the floor were done for his special amusement and would try to take the rag away from me. He made quite a game of upsetting his dish of water and then carrying the dish around. He gamboled with his shadow on the floor. My cupboard held delightful playthings —my rubbers, which he worried dog-fashion, a duster he could drag about, a newspaper to tear up, or a milk bottle to roll around. One day the bottle contained milk, which made it more fun for him and more work for me.

One morning when our sparrow hawk, Molly, was on the floor of her cage pulling at her paper, the sound attracted Ike, who had never seen Molly so close. He didn't seem interested in her as a possible meal, but was fascinated by the crackling of the paper, which he evidently took for an invitation to play. He jumped at the cage several times, bumping his head, and didn't quite understand why he couldn't get the paper. Molly spread her wings and puffed out her feathers, but when he backed up she would put her head on one side as if trying to figure him out. He finally went into the cupboard next to the cage, and when I looked up, a black pointed nose and big ears were peeking around the cupboard door. He continued this game of hide and seek for some time till Molly tired and went back to her perch.

Soon Ike learned the art of begging. Some of the staff ate lunch in my classroom, and who could resist offering a tidbit to a fluffy little fox with appealing amber eyes? Before long he found quicker and more certain ways of getting food if the appealing look didn't bring immediate results. Jumping onto our laps, he would snatch the sandwich from us, in a flash, so the staff had to pack a little extra food for Ike or go without enough for themselves. He was beginning to develop real speed and was very light and quick on his feet—more like a cat than a dog. That, of course, was due to his semi-tractile claws.

I bought Ikey a rubber bone, which he quickly learned to chase when it was thrown, but did not learn to bring back. He was quite willing to give it up when I went to him, and then continue the game.

The day Ikey had his first real bone, instinct asserted itself. He played with the bone for some time, enjoying it thoroughly. Presently I heard a scratching just outside my door, and there was Ikey frantically trying to bury his bone in the hard wooden floor.

On June 15th Ikey began his sojourn at the Rocky River Trailside Museum. The Trailside Museums, located in three of Cleveland's Metropolitan Park Reservations and one City of Cleveland Park, are small buildings devoted to a popular interpretation of the natural history of the areas in which they are

situated. They are operated by the Cleveland Museum of Natural History in cooperation with the respective park administrations. The naturalist and assistants in charge of each museum explain and interpret the exhibits, live and inanimate; give informal talks to groups of adults or children; and in general act as hosts to the thousands who annually visit these nature education centers in the woods.

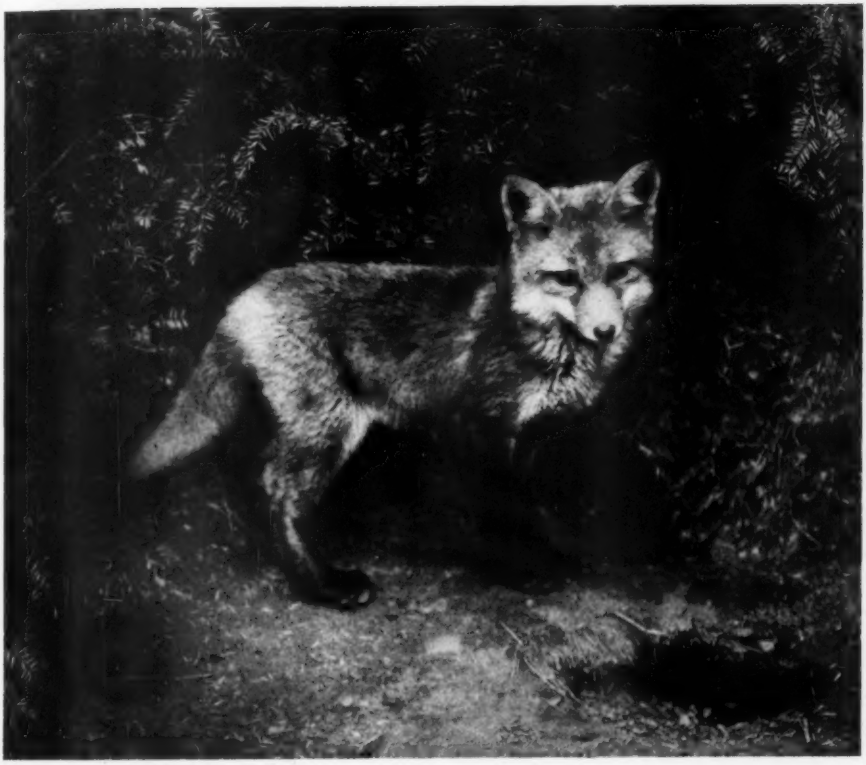
Ikey, tied under a tree near the museum, didn't like the crowds and resented his collar and chain. The first morning he succeeded in slipping loose, and presently there he was, back in the museum, tagging at my heels. He didn't make for the woods as one might have supposed.

Thereafter we kept him in a cage outdoors during the day. He gradually became more tolerant of the visitors, even allowing children to take him walking on his leash, though not without struggling and pulling at it.

At closing time I invited any remaining visitors to stay and watch him play. I brought him inside, closed the doors, and let him run and romp for at least half an hour. We played tag, and I often wondered who was really getting the exercise. Though not very friendly with the visitors, he never tried to molest them. Their pleasure in seeing a fox at close range resulted in many a return visit to the museum. Ike spent the night in a cage inside the building.

In the morning while I got breakfast, Ikey had another hour of freedom, during which he lived up to the reputation of his family for slyness. He would dash for the ice box when I opened the door or snatch any movable object available, always with one eye on me and one on the door for a quick get-away into the rest of the building. Sometimes I would hear suspicious sounds issuing from the museum room, but by the time I got there Ikey would be standing innocently in the middle of the floor looking at me, like a little boy caught near the cookie jar.

Photograph by Dr. James S. L. Jacobs



Fox cub by C. Huber Watson.

When breakfast was ready he came begging for toast, preferably with jam; but once dishwashing began Ikey kept well out of my way, having learned that the next step was to put him into the cage for the day. He caught on quickly to any method used for catching him, making new strategy constantly necessary.

By the end of the summer Ikey was full grown and too big and active for my facilities at the downtown museum, so two possibilities presented themselves; the Zoo or the freedom of the woods. I chose the Zoo, as foxes were being freely hunted in Ohio.

During the fall Ikey welcomed my fortnightly visits with wagging tail, jumping on the cage as he used to when it was time for me to take him out and licking my fingers gently when I petted him through the bars. By January he had ceased to wag his tail and show enthusiasm, but he was still friendly and let me pet him. The other foxes always scurried to the rear of the cage when I came.

In the past three years of museum work, involving first-hand acquaintance with many wild creatures, I have found that animals, like people, differ and have their own individuality. Of all my pets, Ikey stands out as the most lovable, impish, companionable and intelligent. I decided that to the best of his ability he had tried to be worthy of his name and a credit to General Ike.

SAINTS AND NATURE

Ancient legends of saints and holy men prove the close relation of nature and religion.

Woodcuts by Robert Gibbings from "Beasts and Saints," by Helen Waddell. (By permission of Henry Holt & Co., Inc.)

By Alan Devoe

IT may seem that the biographical accounts of Christian saints would be an improbable sort of literature for a naturalist to read with pleasure. The mere sound of the names of these ancient and medieval holy personages—Saint Bartholomew and Saint George of Suelli, Saint Wereburg and Saint Joseph of Cupertino and Saint Marsus of Auxerre and all the rest of them—is likely to conjure up the more repellent nonsenses of hagiography. There comes into the mind's eye the picture of a stiff and unnatural figure in a monastic habit, wearing upon his face an expression of unearthly and wooden sweetness, clasping his hands perpetually in prayer and staring upward as though to eye the halo that floats forever a few inches above his tonsure. What enthusiast of nature and natural life would care to read the biography of *that* pious statue? Surely it would be only a tale of "edifying" miracles and martyrdoms . . . of creaking supernaturalism, and bad science, which could afford small pleasure to any enthusiast of birds and beasts and homely forests and the honest sunlight of common day.

Well, there is certainly plenty of pious legend in the lives of the saints, to be sure. Threats to the holy man are miraculously warded off; statues miraculously burst into speech; the dependable world of everyday is continually turning topsy-turvy in some spectacular manner as a testimonial to the saint's singular spiritual powers and endowments. Myth and legend accrete very fast around any great man; and after a thousand years or so the legends may bury the real man under a prodigious layering.

George Washington was scarcely in his grave before his honesty (which was apparently a fact) had become memorialized in a spectacular yarn about a cherry-tree, which appears not to have been a fact at all. The life becomes the legend; and even the subject's physical appearance soon gets to be represented in an

"official" depiction which stiffens the real man into a statue and dries all the juice of human life out of him. The preternaturally granite-faced and dignified George Washington who stares at us majestically from a dollar bill has the look, very obviously, of a man suitable to be the Father of His Country. Whether he bears much resemblance to the real Washington who was a flesh-and-blood country squire of a robustly human eighteenth-century cast, is at least a little problematical.

The exaggerations and formalizings that change the living likeness of a statesman into an artificial figure of honesty or patriotism, or whatever, naturally operate in the case of a saint to change his spiritual qualities into similar symbolic exaggerations. It seems to be a fact that Saint Joseph of Cupertino was often lifted up in so great a spiritual ecstasy that a beholder could almost fancy that the holy man was actually lifted above the ground. (Just possibly, indeed, he *did* rise into the air a little on these transcendent occasions; there are at least a few scientists prepared to believe that something like levitation is not necessarily impossible.) But in the story of the saint's life, of course, his exaltation becomes so magnified and symbolized a thing that the pious histories of him insist that in his moments of ecstasy he went fluttering around the upper reaches of churches like an inspired bat, or, on occasion, hovered over a holy spot with the accomplishment of a kestrel.

Once it is cheerfully acknowledged, however, that the lives of the saints may contain a good deal "that ain't so"—(and after all not even the most rigorous denominations of Christian orthodoxy insist that a reader must believe *everything* that is alleged in the pious labors of the hagiographers)—a look into the lives of the saints discloses that, down under all the layerings of legend, the saints do have a very real quality, attaching unquestionably to their real historial lives, that makes many of them particularly congenial men for a naturalist to know.

It is the common quality of most of the saints that, whatever else they were, they were naturemen. They were men in whose lives, that is to say, there was a profound and persistent sense of community and brotherliness with the whole of creation. Whatever miracles a given saint may or may not have performed, he will be found almost always to have had a kind of creaturely closeness to that central miracle which all men of whatever belief acknowledge: the miracle of the natural world, bespeaking, in all the songs of Brother Bird and all the moon-howlings of Brother Wolf, and all the blue shining of Brother Sky and all the restless glintings of Brother Sea, the glory of its Source.

All religions are in a certain profound sense nature-religions. That is, however their adherents may define That Which accounts for the universe, and under whatever mode or method they may render their homage, there is always in some sense a reverence for things-as-created: a sense that the gift of life—whether the life of men or mice or chickadees or rivers—is a *gift,* and that it may therefore not be misused by any man who would be worthy, but must rather be respected, even in a sense worshipped, for what it contains and shows forth of That Which gives it its being. A respect for all things of earth and common clay is in fact particularly inseparable from Christianity, a faith in which the most stupendous tenet of all is the doctrine that The Unnameable Itself once took

on earthliness and thus a creature-closeness to all things earthy, and thereby dignified them by a literal and unmistakable demonstration of the indwelling in earth-things of the divine principle.

Saint Francis of Assisi is of course the Saint best known for his expression of this attitude of a simple earth-honoring and earth-rejoicing piety. "Going back," says Saint Bonaventura, "to the origin of all things, Francis considered created beings as coming from the paternal heart of God. This community of origin made him feel a real fraternity between them all. 'They have the same source as we have,' he said. 'Like us, they get the life of thought, will, and love from the Creator.' He accepted to the letter what seemed to him the consequence of this truth." But this same quality of natural piety is found also in innumerable others of the saints . . . obscure saints, saints who have been rendered by the hagiographers into very strange and un-simple shapes indeed, but saints whose lives on this account are full of beguiling and true occurrences, deep down under the layering of myth, that make congenial reading for a naturalist.

There is Saint Anthony of Padua, for instance. It was the habit of that good man, when he wearied of the contempt or apathy of the human audiences of his preaching, to make his way to where the Adriatic lay expanded and glittering under the good sun, and to address himself upon the subject of the excellence of nature and the goodness of God to such schools of *fish* as might be near the shore. I believe every word of it. The addressing of a few pleased and hosannalike remarks to a school of fish, on a glistening morning in June, is surely the most natural thing in the world for any life-delighted natureman. Henry Thoreau himself might have done as much. When the hagiographer assures us that the fish, having heard Saint Anthony's ejaculations, responded thereto by bowing (as best they could) in the water, or by flipping their finny tails in an adroit sign of the cross, well . . . after all, there are those who say that George Washington didn't throw that dollar across the river either.

We musn't be put off Saint Anthony by such trifles; nor off The Blessed Jordan of Saxony, surely, by similar pieties in *his* story. Certain of his miracles may perhaps be a little hard to take, but why should we therefore deprive ourselves of reading the undoubtedly true story of his encounter with a little animal that he met one day while out for a walk? It seems that Blessed Jordan was found by some companions holding this little animal upon his knee, tickling it under the chin, and addressing to it words of brotherly salutation. The companions were considerably horrified, because the animal, it seems, was none other than a weasel. I believe *that* story, too. If a latter-day hagiographer had invented it, the animal would have been something pretty and insipid, like a rabbit. The whole attitude and temper of a sensible and well-adjusted natureman could hardly be better exemplified, I think, than in this anecdote of Blessed Jordan. After all, nature (or God, if you will) did make weasels, quite as much as more sentimentally attractive creatures.

The stories of saints and their comradeship with nature are far too many even to begin to list, much less to tell in this small space. There was Martin of Perres, for instance. I don't know all the miracles he may have done, but I do know that he figured in a remarkably pleasant story about rats. His sacristan complained to him about the rats, and asked Martin to get rid of them. Martin did. He prowled carefully around the monastery, gathered all the rats into a comfortable and commodious basket, took them outside the grounds and set them free . . . ever afterwards putting out some tidbits for them, on the theory that, since they had quite as much right to be alive as he had, and since he had evicted them, he owed them that small courtesy "to the greater glory of God."

And then there was the holy Karilef. This excellent monk, having taken off his monkish frock one day while he was hard at work under the hot sun pruning some grape vines, discovered, when he went to put the frock back on again, that a wren had made its nest in one of the pockets. The simple Karilef, according to his biography, was so perfectly delighted by this little happening that he couldn't sleep at all that night. What's more, he left the frock hanging outdoors and cheerfully went coatless until the young wrens had hatched.

Saint Fructuosus, the Archbishop of Braga, was so exceedingly comradely with all wild things that he was presented, when he desired to hide out in the woods and live the life of an unvisited hermit, with a considerable difficulty. People kept learning his whereabouts, it seems, because of the to-do that the jays raised. Who can doubt it? Who, at any rate, who has ever tried (whether he be a Saint or not) to be stealthy in a woods where blue jays are?

Saint Rose of Lima . . . Saint Francis De Sales . . . Saint Philip Neri . . . Saint Columba . . . Saint Marculph . . . Saint Aldemar . . . Saint Pharailde . . . every one of them has been connected in some way with some homely, earth-close story that must delight a naturalist's heart. More than that, there shines forth in the saints a particular attitude of mind toward nature, a particular temper of brotherhood with the natural world and with all things that live in it, that is after all the quintessence of all good naturalists' religion, whatever (if any) their formal creed may be. There is even the suggestion (though I hardly suppose the hagiographer would approve of such interpretation) that a certain amount of holy humbuggery may justifiably be used by a nature-lover in a good cause. I am thinking of the story told about Saint Godric.

Godric was placidly meditating one day in his green woodland retreat, when there came panting to his door an exhausted stag, which was being hard pressed by huntsmen who were close relatives (embarrassingly enough) of Bishop Ramulf. The holy Godric, who detested stag-hunting with the whole of his kindly and stag-brotherly being, unhesitatingly flung open the door of his monastic cell, invited the stag into its sheltering confinement, slammed the door, and stepped outside to await the arrival of the huntsmen. When the huntsmen came clattering up, they asked Godric, as he had expected, where the stag was. There ensued only a very brief conversation, the effect of which was to send the hunters galloping off and away. Godric had satisfied them, apparently, that at least the stag was not in the immediate vicinity. Saints, it is understood, do not tell lies. But there is apparently no objection to a nature-loving saint's using to the maximum his agility of mind. What Saint Godric had said to the huntsmen, it seems, was simply the accurate words, "God knows."

Where

FOREST

and

From Minnesota forests to the North Dakota prairies the author encountered the richest variety of nature in America and some of its most spectacular landmarks, all in the space of a 200-mile drive. At the center of the North American landmass Maurice Brooks shows us new beauty.

FORESTS of oak and pine, prairies where the tall grass undulates with the breeze, high plains with carpets of short grass and endless sage-brush—these are the major plant elements which clothe our land between the Atlantic Ocean and the Rockies. With infinite variety the vegetative pattern unfolds across two-thirds of a continent, the transitions from one plant type to another coming, for the most part, gradually and without dramatic abruptness. Coniferous and deciduous woodlands meet and mingle their species; the forest becomes open and parklike at the prairie margins; and

Rothstein (F.S.A.)

PRAIRIE

Meet

By Maurice Brooks

one passes from tall grass to high plain without noting the transformation. Boundaries between the types are always just ahead—or just receding in the distance.

Up toward the Canadian border, in the mid-continent Minnesota-Dakota country, nature shifts the scenery much more rapidly however. Here are the outposts of the eastern coniferous and deciduous forests, and just beyond lies the vast Red River prairie. A single day's drive takes the traveler from white pine woodland to sage-brush plain. Biological transitions come with almost bewildering rapidity, and the observer scarcely has time to dwell with one set of birds or plants before he must adjust his thinking and his observing to entirely new forms.

This Minnesota-Dakota country is no ordinary week-end run from my home in West Virginia, and I cannot pretend to any very profound knowledge of the region. Since places may often be seen in a somewhat different aspect through the eyes of a visitor, however, I do want to call your attention to the charms of the land and some of its living things. There is no better way of doing this, I think, than to record some impressions gathered as you drive 200 miles or so from the Minnesota lake country, with its pine forests, to alkaline Devils Lake in the rolling prairie of North Dakota.

A good point of departure (since so many persons visit there anyway) will be Lake Itasca, where the Father of Waters starts its 2500-mile journey to the Gulf of Mexico, and where, on the day which began his second year of life, my son waded the mighty Mississippi. Here is the great northern coniferous forest near its southwestern extremity, a land of lakes where the loon calls, and of rolling

hills covered by magnificent stands of pine and spruce, with white birch and aspen taking over where the forest has been much disturbed. Canada jays and Arctic three-toed woodpeckers occur locally; white-throated sparrows and hermit thrushes sing from every lowland tangle, and down at the edges of the swamps and bogs Connecticut warblers build their nests and sing their ringing songs.

This forest differs in detail, but is essentially like that of corresponding areas to the east, portions of the Porcupine Mountains of Michigan, the Algoma country of Ontario, the Adirondacks of New York, and the great conifer belt of Maine and New Brunswick. There is scarcely a hint of the abrupt transformations that await you just to the west. The birds, mammals, and plants are of the forest—the prairie has spilled over but little into the woodlands.

White pines of tremendous dimensions occupy the better forest sites around Lake Itasca, but this is an area where moisture is a critical factor, and the forest changes with each new environment. Somewhat drier slopes are covered by cathedral groves of red pines, the trunks often arising for 60 feet without a branch. Dry ridge tops are likely to be covered by stands of jack pine, which here reaches its maximum dimensions.

West of Itasca this pattern repeats itself for a few miles, and you are scarcely aware, physically, when you cross a geographically spectacular feature of the North American continent, the Height of Land which divides the waters that roll to the Gulf of Mexico from those that find their way to Hudson Bay. Here the Height of Land is just a low ridge, largely covered with birch and aspen.

Another change of tremendous abruptness is just before us however. Almost as though an impassable boundary had been placed between them, the coniferous forest (with its northern deciduous associates) ends, and the hardwood forest, with its mossy-cup oak, box elder, green ash, American elm, etc., begins. There is a sharp zonation of plant and animal life such as one finds often on mountain slopes. The thrushes and conifer-dwelling warblers disappear, their places taken by vireos and other birds of the broad-leaved forests.

This deciduous belt is quite constricted in the North Country. After three or four miles the trees begin to thin out until the forest has a parklike appearance, the natural reaction of the plants to a diminishing water supply. One might easily imagine himself in some of the California oak groves, so regular is the tree spacing. But not for long—before us is a low ridge, the lateral moraine of a glacier which once shaped the landscape, and there beyond is the treeless prairie, that inland garden of wheat and other grains, the valley of the Red River of the North. I know of no other place in eastern North America where you can pass through the northern coniferous forest, over a continental divide, into a deciduous forest, and on to the prairie in the space of thirty miles.

The Red River valley is the basin of old glacial Lake Agassiz which once poured its abundant waters through the valley of the present Minnesota River to the Mississippi. As the ice sheet moved northward it may have tipped the land slightly, so that the Red River now flows northward to reach Lake Winnipeg. Four well-defined beach lines mark different levels of the ancient lake. The low sandy bluffs which the waters left are points of special interest to the biologist, for they have not, generally speaking, been disturbed by the plow. Here you can find remnants of the original prairie flora; here the skinks sun themselves on hot days; and here occasional pairs of burrowing owls excavate their homes.

This northern prairie country has been less plowed than is true southward; there are still large plots that have never been turned, and although the grasses have been modified somewhat by man's introductions, the native species still pre-

dominate. Among the tall grasses are flowers in abundance; showy purple cone-flowers in early summer, spikes of blazing-star later, and a wealth of legumes—amorphas and bush clovers throughout the season. Tucked away there will be many *Spiranthes* orchids, little ladies-tresses.

It is a dull eye indeed that won't be caught by the grama-grass *(Bouteloua gracilis)* where it covers the beach lines and sand hills. This low grass, one of the most famous of the buffalo forage species, has foliage which the summer sun turns honey-yellow and flower spikes of an indefinable lavender shade, almost the identical color combination which nature has blended in the imperial moth. The chosen food of the world's mightiest game herd, this is a plant to stir the imagination of every American outdoorsman.

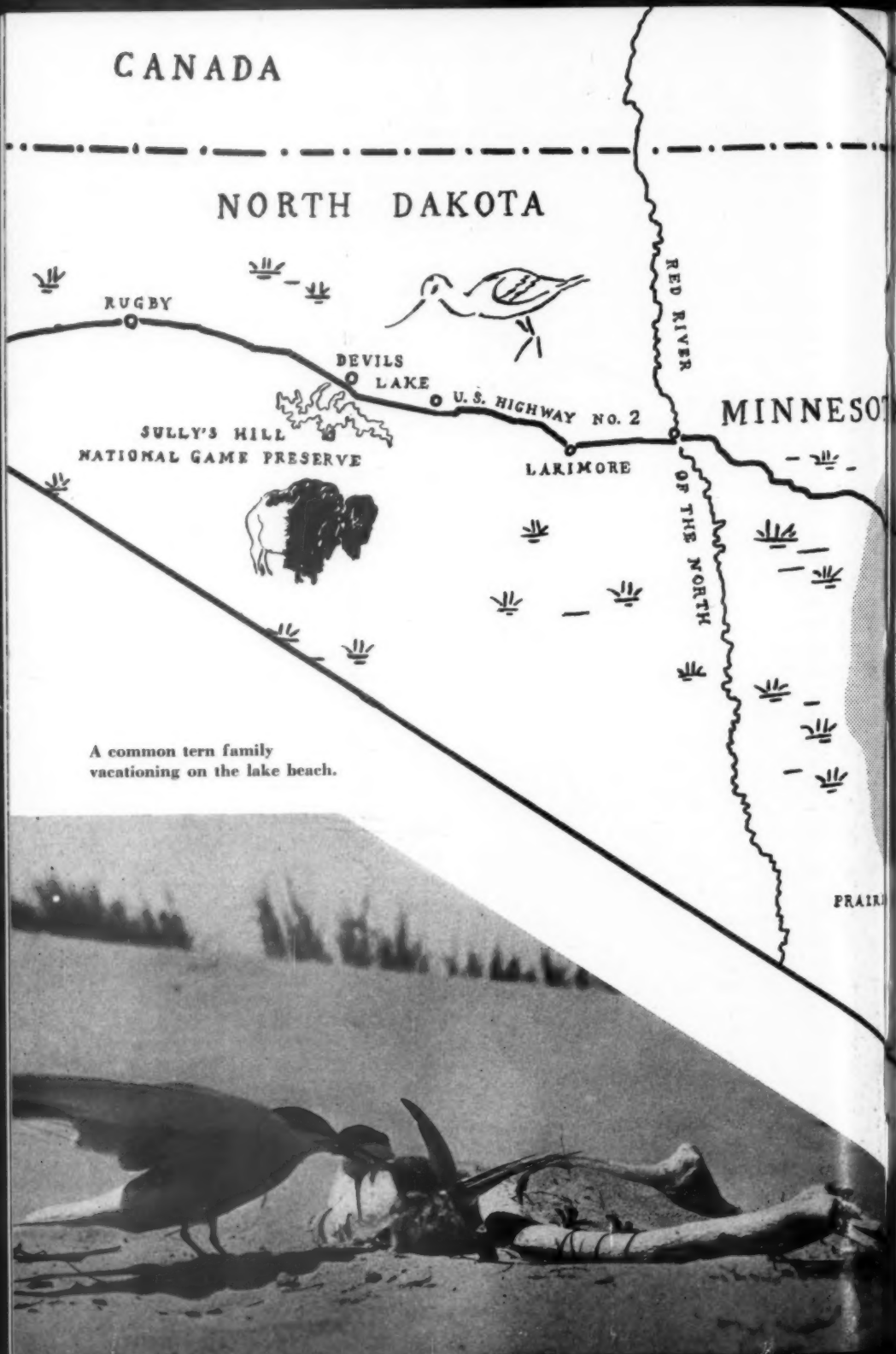
Aldo Leopold has pointed out the tremendous significance to all kinds of wildlife of margins where habitats change abruptly. Surely nature affords few more climactic changes than those between the forest and the grasslands. Every arboreal and scandent species is left behind as you cross to the prairie; running and burrowing mammals and ground-nesting birds become dominant; even the soil character is different. You begin to look eagerly for new species.

Nor do you, in this Minnesota-Dakota country, have long to wait. The importance of the wayside telephone lines is at once apparent, for these afford the only perches which are high enough to serve as observation points. The eastern kingbird was common back in the parklike deciduous woodland; now within a few miles there will surely be western kingbirds along the wires as well. Upland plovers and prairie chickens are immediate possibilities, and the ring-necked pheasants are ubiquitous. Western meadowlarks delight every eastern ear, every western one too, to judge from the number of states which have selected this species as official state bird. Baird's and lark sparrows may be found, and, in suitable spots, Leconte's and Nelson's as well.

The first prairie pond, with its surrounding marshes, is a place to relish and to remember. The easterner is likely to see here a number of new bird species in a few minutes. In my own case, I strain my eyes for the sight of the first yellow-headed blackbird. George Sutton, on one of his many fortunate days, saw a stray bird down in West Virginia, but I have never had such luck. But here they nest about every prairie pond, and are quite likely to startle you by alighting on the road just in front of your car. Before I saw them I was prepared for the yellow heads, but not for the flashing white wing patches. I never have gotten used to it; every flock that rises from the sedges or roadside startles me afresh. To me, this bird *is* the prairie pond—the others make up the accompaniment.

The accompaniment, particularly in late summer, is likely to be a rich one too. During August the young blackbirds are all awing, Brewer's, red-wings, yellow-heads, and grackles. Grebes and coots are at the pond margins. I particularly like the little eared grebes, bright in their breeding plumage, showy and unafraid, readily observed at close range from a car parked at the roadside. Ducks of several species attend their youthful convoys. A pebble tossed into the rushes sets the soras to calling in protest at such disturbances. Black terns join the swallows in skimming over the open water or hovering above the marshes. There is constant sound and movement, all of it interesting and attractive.

The Red River valley is settled country, much the same throughout its expanse. In the light of its romantic history, you approach the river itself with greater expectation than the rather unimpressive little stream justifies. It is hard to picture this as the highway of the French-Canadian voyageurs, bound for the trapping lands and trading posts



A common tern family vacationing on the lake beach.

"Old Timer's Cabin"
on Lake Itasca, Minnesota.
Photograph by
W. W. Wettschreck.

BEMIDJI

LAKE ITASCA

Source of the
MISSISSIPPI RIVER

Lake Superior

DULUTH

CONIFEROUS FOREST

TRANSITION AREA
DECIDUOUS FOREST

Curlew and willets on the lake sands. Photograph by A. D. Cruickshank.

in the Hudson Bay wilderness. But I find it difficult also to picture today the frontiersmen and their scows drifting westward along the Ohio, bound for the Missouri and the conquest of a continent.

As I cross the Red River and enter North Dakota, I often think of a roadside sign which some advertising company has placed along U. S. Highway No. 20 some hundreds of miles to the east. Among a series of displays which edify the passing public by setting forth some characteristic—a nickname, or a natural feature—of the several states, there is one erected to honor North Dakota. Its panel bears the caption, "North Dakota, The Flickertail State." And to give point to this caption there is a painting of a flicker!

At the risk of offering information to those who need it not, I will remark that a flickertail is no part of any feathered creature, but is the lively and attractive little Richardson ground squirrel. Perhaps, however, this display in the East is symbolic of a lack of general knowledge concerning the State of North Dakota and its fauna, human and otherwise.

Northeastern North Dakota is made up of two great prairies, the very flat Red River valley to the east, and a much more rolling prairie to the west. Separating them near the Canadian border is a range of low hills, the Manitoba escarpment, but this runs out before U. S. Highway No. 2, the road to Devils Lake, crosses from flat to rolling terrain. To the west and south of the Red River valley are the Dakota sand hills, looking impressively high in a region of unbroken horizons.

My first sight of this rolling prairie and sand hill country came on an August evening. Eyes wear out looking for new things in a fresh country, but not in vain. On the Red River flatlands I had looked for, without finding, Franklin's gulls, but now I began to see them, not scattered but in great flocks, and becoming more and more abundant as we went westward. In some of my homeland Appalachian valleys I have driven on an occasional late August evening when nighthawks were flying everywhere, the air seemingly alive with them. Increase these flocks by ten, by one hundred, it matters little what figure, and you have the Franklin's gulls over the Dakota prairie. In the far distance the low sun caught the glistening whiteness of their wings just as it sometimes does the flakes of an approaching snowstorm. I have seldom been so aware of living things.

In this Dakota country much plowing was in progress, the gulls and the Brewer's blackbirds in incredible numbers following the turned furrows. And, of course, the flickertails were present everywhere beyond the Red River valley.

They like to stand beside the road or in the open fields, their plump golden-brown bodies motionless, but their short tails constantly in motion. They look remarkably like miniature prairie dogs, and, unfortunately, they are not loved by the wheat farmers, or the greenkeepers on the occasional golf courses.

As we drove toward Devils Lake we noted the many shelterbelt tree plantings which thread the countryside. This effort of foresters to establish trees on a treeless prairie represents, perhaps, the most ambitious (as well as the most controversial) project which the profession has ever undertaken. It has succeeded beyond the expectations of its planners, and today there are millions of young trees, many of them growing vigorously, where none grew before. Houses and fields are receiving shelter from the drying winds which so often drive dust or snow before them. Soil moisture in thousands of valleys and on thousands of slopes is being conserved, to the advantage of crops. The birds of the woodland are finding shelter and building sites in a country new to them, and the whole avifauna is being enriched.

It is hard to find a measure for the social implications of such a project. Man asserts some control over his habitat, and in doing so provides a shady spot for a pause from work, or for a family picnic. I watched with pleasure a group of youngsters, in one such belt, splitting and enjoying a watermelon. It is conceivable that some of those youngsters might never have played under the shade of a tree until the plantings grew. Easterners, who are essentially forest people, find it difficult to get any realization of this—one must see a barren, unsheltered, and unadorned Dakota homestead to sense some of the meanings implicit in these prairie tree belts.

I am glad that I first saw Devils Lake at early morning. The lake road winds two miles from the town of that name, and before it was light enough to see them we could hear the voices of the wildfowl around us. As dawn came the birds began to rise from the water, and wherever we turned our glasses we could see birds, not as individuals but in flocks, thousands, myriads.

Devils Lake is unusual (for North Dakota) in that it has a considerable fringe of good-sized trees around it. This forest is made up largely of mossy-cup oak *(Quercus macrocarpa)*, and characteristically the topmost branches are dead, tribute to the desiccating power of unchecked western winds. As we passed through this belt of forest, I thought for a moment that I was back on Cape May Point on the morning of a good hawk flight. Every dead treetop seemed to have its sentinel hawk, attracted in part, I suppose, by the swarms of songbirds con-

Franklin's gulls photographed by A. D. Cruickshank.

gregated in the tangles. The illusion lasted, however, only until a fine Swainson's hawk circled above us.

Then the forest ended and the shrubby fringe, mostly buffaloberry and silver berry, began. We were through this in a moment, and there on a bar at the lake margin at my first glance I saw just before me a flock of over one hundred avocets!

It is a bit naive to be surprised at the presence of a bird within its range, and I know that the native bird student would have found nothing of special interest in this concentration, but it must be viewed through the eyes of an easterner who has spent many hours looking (in vain) for a single avocet along the Atlantic seaboard. Perhaps half of the birds were young of the year; the others were in their classic black and white, still with the apricot-pink heads and necks of the breeding season. As they fed they swept their long, upturned bills through the water in a sicklelike motion. They were easily approached, and for a few minutes we had eyes for nothing else.

Then we began, slowly, to realize how many shorebirds were along the beach. Just below the avocets was a compact little group of thirty or forty marbled godwits. I was unprepared for the richly contrasting wing-tip "V" of chocolate brown which serves to accent the cinnamon brown of the remaining upper parts. With the godwits were scattered western willets, flashing black and white in flight. Wilson's phalaropes walked through the sedge areas, and a little flock of buff-breasted sandpipers alighted just in front of us. There were hundreds (thousands perhaps) of dowitchers, many with the very long bills which suggested the western race. And everywhere ran or stood the smaller sandpipers and plovers. During that morning scarcely a yard of the many miles of beach was without its shorebirds.

Out on the lake it seemed that all the Franklin's gulls in that part of the Dakotas had concentrated to spend the night. They were arising, calling and circling before they scattered out onto the prairie. Grebes of several species, terns, coots, even a few white pelicans were present.

And such numbers of ducks, and of so many species! Mallards, gadwalls, baldpates, pintails, green and blue-winged teal, shovellers, redheads, ring-necks, canvas-backs, scaups, golden-eyes, white-winged scoters, ruddy ducks and mergansers were all present. Best of all (it may have been a lucky accident) was a little group of cinnamon teal, certainly among the trimmest and most attractive of North American waterfowl.

Comparisons are hard to draw, and are quite likely to be misleading. This I know, however; I have a fair familiarity with many of the places in eastern North America where birds congregate in migration or in winter. I have never visited any other spot which seemed to me to have the tenth part of the birds which were around Devils Lake on that August morning. On the shore, on the water, in the air, for miles there was a flashing of wings.

Unless there is a change in the climatological trend, Devils Lake is a dying

The Blazing Star photographed by W. B. Tyrrell.

body of water. In 1889 there was a steamboat landing at the town itself, and, as one drives the two miles to the lake at present, he is startled to see atop a telephone pole the sign which marks the water's surface level during that not distant year. The lake water is highly alkaline, and around the shores we found distressing evidence of the botulism which so frequently destroys numbers of waterfowl on our western lakes. In places, duck carcasses lay literally in windrows where a storm of a few days past had piled them. Perhaps the storm itself, by disturbing the waters, had saved the remainder; we saw no evidences of sick birds during our visit.

The beaches had their interesting land birds as well. Buffaloberry *(Shepherdia argentea)* and silver berry *(Elaeagnus argentea)* were loaded with fruit, and in these shrubs the migrant and resident warblers were swarming. Nelson's sparrows were in the rushes.

The 99th meridian west of Greenwich passes through Devils Lake; thus the area does not quite reach that magic line, the 100th meridian, which seems biologically to separate East from West in North America. Such western species as mountain bluebird, magpie, and lazuli bunting may occur as stragglers; we didn't see any of them.

By no means are all the charms of the region at the lake itself. Just south is the Sully's Hill national bison range. A few miles to the north and west is the Sweetwater Lake region, where long-billed curlews nest and congregate. Not far beyond, the town of Rugby occupies the exact geographical center of the North American continent. A little farther still are the high plains with their purple sage. The West begins here.

And everywhere are the Sioux Indians. These Sioux may have been nomads, but they produced Red Cloud, Crazy Horse, and Black Elk, and pride is in every line of their lithe, athletic frames. Many still living recall their last uprisings in 1890. When the young bucks come into Devils Lake for a Saturday night frolic they have a bearing and a light in their eyes that suggests the not-too-remote possibility of a scalp dance right then and there.

This is the country from which the famous old Seventh Cavalry (heard from more recently when they relieved the Japs of the Admiralty Islands) began their ride with Custer and French to the Little Big Horn. To the south and west Lewis and Clark spent the first winter of their fateful expedition.

Yet one feels in the fine North European people who dwell on the prairies a curious lack of background in American history. For most of them, America began in the 1870's and Jim Hill was the father of his country. It would be a splendid thing if they could know more intimately the America that is Lexington and Concord, Valley Forge and Gettysburg, Williamsburg and Mount Vernon, Fort Moultrie and King's Mountain; just as it would broaden the horizon of many an easterner to see the inland granary of the Red River valley and the grazing land beyond it. Perhaps one day our pride of heritage and common destiny will be felt more clearly and deeply.

The hill-dweller has to learn to appreciate the sweeping prairies, a land of unbroken horizons. Lillian Mayfield Wright, herself a hillchild, expresses it:

And so I think the hillchild always sees
That broken line inked in against the skies,
Where saffron sunset drops to meet the trees
Upon the hilltop—and the nighthawk flies.
And when his mind cannot recapture these,
I think that something in the hillchild dies.

Two ways there are, however, to view the prairie's vastness. In that vibrant book, "A Texan in England," J. Frank Dobie tells the story of two bishops who visited an English cathedral. One said, "A place like this makes me feel little. I shrivel down until I am no bigger than a rat!" The other said, "A place like this makes me expand until my soul seems to fill every corner and cranny." I think the vast prairie will make your soul expand!

On the Trail of

By John K. Terres

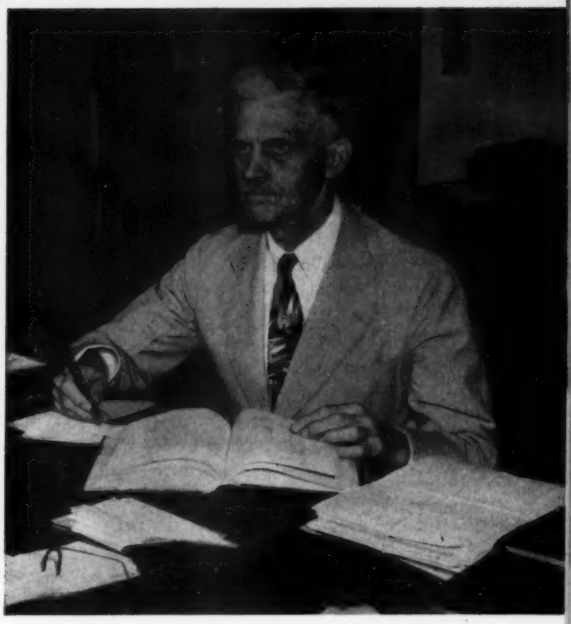
For more than 37 years, Dr. James P. Chapin has studied the wildlife of Africa—the

ON June 13, 1927, James Paul Chapin struggled up the last few yards to the crest of Mount Karisimbi, 15,000 feet above sea level. He had reached the top of the highest mountain in the volcanic Kivu region of central Africa. There were no live birds there to greet him, only the weathered remains of a few small tropical birds that had perished on the cool, barren mountain top. In the tropics, animals sometimes wander from the lower forests to the alpine heights where they die of hunger and exposure.

But Chapin noticed neither the foggy cold, nor his shivering black companions. Among the lichen-covered boulders at his feet lay a dried monkey carcass with a white stripe running down its nose. Most remarkable, it was not one of the "golden monkeys" of the lower bamboo-covered slopes, but *Rhinostigma hamlyni,* a gray owl-faced monkey whose habitat had remained a mystery for many years. Only recently has it been found dwelling on the long mountain chain west of Lake Kivu.

Thirteen years before, Herbert Lang and Chapin, on one of the earliest expeditions sent abroad by the American Museum of Natural History, had obtained a live specimen that was the second one known to science. The first monkey Jim Chapin ever shot was the second known specimen ever collected of *Allenopithecus nigroviridis,* a rare, river-bank monkey of the Congo region.

Although Chapin got the scientist's satisfaction from collecting rare and interesting creatures, he did not enjoy killing the larger game animals. He was as far removed from the destructive big-game hunters of his day as are loons from song sparrows. It can be truthfully said that he has seldom shot any large creature without regret. All



All photographs by courtesy of the American Museum of Natural History

CONGO JIM

highlights of his career prove that fact is often stranger than fiction dares to be.

through his beautifully written accounts of the Congo, one may find a sincere note of sadness when an animal is necessarily added to the Museum collections.

One of his most remarkable collecting feats was in pursuit of an unusual bat-catching hawk. One evening in the year 1911, he risked a snap shot in the dusk at one of these creatures. It fell in the shallow waters of the river Dungu. When Chapin retrieved the bat-catching hawk, there were four different species of bats in its crop and stomach, three of which were later described as new to science! His amazing shot had collected five specimens at once. One of the bats was named for Chapin.

Today, Jim Chapin is Associate Curator of Birds at the American Museum. His scientific curiosity is enormously wide. He has remained as keenly interested in mammals, plants, reptiles, fishes and invertebrates as he has in birds. Like Francis Bacon, he may have longed early in his career to make all knowledge his province.

Whatever Chapin does, he does extraordinarily well. He has unusual powers of observation and lucid description, coupled with a keen analytical mind. His thoroughness and retentive memory are proverbial; but he also has great versatility. Rarely does one find artistic qualities merged with the scientific mind. Chapin is an artist, writer, and lecturer; and he makes bird skins that are considered the best.

Chapin's original colored sketches of fishes of the Belgian Congo illustrated the first scientific report of the American Museum-Congo Expedition. The colored portraits of four beautiful bats in one of the American Museum Journals illustrate an article by Lang and Chapin on "The Bats of the Belgian Congo." Chapin did the portraits in the field in

Africa, with the strange little creatures lying before him. For several habitat groups, he prepared very exact colored drawings of the different leaves of the tropical forest, and two background sketches for African bird groups. His many little field books and diaries are filled with exquisite drawings, some in color, of vegetation, birds, mammals, and mountains.

Dr. John T. Nichols, an associate at the Museum, recently said: "Chapin is a perfectionist, but demanding perfection only of himself, not of others. He not only knows the birds of Africa more thoroughly than anyone else, but if you were to ask him about a tree or a fish there, he could probably tell you a great deal about it. . . ."

Three African mammals bear Chapin's name; a beautiful yellow bat, a spiny-tailed flying squirrel, and a gray hyrax. But it is with birds of Africa that he has established himself as one of the world's foremost authorities. Seven African birds are named for him; a blue-spotted guinea fowl, a barbet, warbler, lark, pipit, a big, brown shrike, and the Ruwenzori francolin—a strikingly handsome mountain partridge. Chapin has himself described about 50 species and subspecies of birds.

Few boys of nineteen are faced with a decision of whether to continue college or go to the steaming jungles of Africa. Jim Chapin chose Africa. As a result of his eight years there, divided into four trips, the bird collections of the American Museum of Natural History have been swollen by about 10,000 specimens and our knowledge of African birds increased by two large volumes, "The Birds of the Belgian Congo."

The third and fourth books of this series are now in preparation. The first volume was published in 1932. It was submitted by Chapin to Columbia University in fulfillment of a thesis for a doctor of philosophy degree at the urging of his close friend, the late Dr. Frank M. Chapman. The volume concluded his university work at Columbia where he had been a student—off and on—for sixteen years!

Someone has said, "Fact is stranger than fiction dares to be." Jim Chapin has seen just about as much scientific adventure as ever is given to one man. His experiences could fill many volumes that would be more interesting than a "Tarzan" series.

For eight years, Chapin roamed the vast Congo basin for 1,800 miles from Banana to Aba and climbed several of Africa's highest mountains. He was the second man ever to visit the 15,000 foot Stanley Glacier; on Mount Kenya's slopes he found the rare forest-dwelling ibis discovered by the Akeleys in 1910; he saw large sunbirds at 15,000 feet on many of the higher mountains of Africa; and stood on Mount Kenya's eternal snows watching red-tailed augur buzzards soaring where birds are seldom seen. Yet he will disclaim any prowess as a mountain-climber.

Chapin has hunted birds in the east African big-game fields. There among lions, zebras, and rhinoceroses, he studied red-billed tick birds, secretary birds, and marabou storks. And there were large vultures that find their food by sight and not by smell, and ostriches whose call he found resembled the roar of a lion. Here he also found the incredible honey guide, the little bird that leads men to colonies of wild bees.

The Chapin sense of humor, always effervescent, must have boiled over the day he and Lang bartered with an African chief, Okondo, for a young, cap-

The incredible honey-guide which leads men from the jungle trails to hidden bee's nests hoping for some scraps for itself.

tive crowned eagle. It was impractical to carry the huge bird alive within its cage. The quickest way to prepare it for skinning was to give it meat containing strychnine.

The deadly dose killed the eagle almost instantly. Chief Okondo was so tremendously impressed with the "white magic" that he would exchange no more gifts unless they included some of the deadly strychnine! A tiny bottle of harmless boric acid was quickly substituted and solemnly presented to the old chief. Chapin remarked afterward that ". . . he hoped Okondo never tried to dispose of any of his enemies with the stuff!"

Chapin was once charged by a cow rhino with her calf, but the beast veered off when eight or ten yards away. He will tell you that in all his eight years of wandering in Africa, an infuriated wart hog was the only animal to give him a real "charge." Wart hogs have sharp tusks and are formidable animals when aroused. One day, a wounded wart hog bore down suddenly on Chapin who was armed only with a shotgun. His first load of buckshot failed to kill the animal, and it continued to rush at him furiously. Chapin fired his remaining cartridge of birdshot almost in the wart hog's face. Fortunately, the light charge turned the animal which disappeared in the brush and was not seen again.

Chapin's bird studies haven't been confined to Africa. He has sought birds in Europe, the Canadian Rockies, and Panama. In 1930, Chapin sailed on the Astor Expedition to the Galapagos Islands on the yacht Nourmahal. On Indefatigable Island, he found hawks so fearless of man that they stepped from the branches of trees to poles pushed under their feet. The expedition accomplished the unprecedented when it brought back 265 live Galapagos fish 3000 miles to New York by keeping salt water flowing through the tanks day and night.

In 1934, Chapin with his good friend Francis Jaques, the bird artist, spent

Porters of the Congo Expedition emerging from the dense forest trail.

more than six months sailing 14,000 miles in the southern Pacific. They were attached to Templeton Crocker's expedition on his yacht "Zaca" sent by the Museum to gather materials for bird groups from Polynesia and the guano islands off the coast of South America.

Chapin was born on July 9, 1889, in the upper west sixties of Manhattan, less than a mile from the American Museum. His boyhood was spent on Staten Island where he was christened "Chippy" by his companions. While other boys were playing baseball, young Chapin and his pal, Alanson Skinner, were climbing trees looking for bird's nests, or searching farm fields for Indian relics.

Chapin says his family only mildly approved his scientific predilections which varied so markedly from the careers of his ancestors. They had been bankers and wholesale grocers—everything except scientists. Unlike the late Frank M. Chapman, Chapin does not believe that ornithologists inherit their interest in birds. He believes that what is inherited is a certain "irritability" toward the world that may become the disciplined curiosity of the scientist, or the free imagination of the artist.

The first professional naturalist Chapin ever met was William Beebe. When he was thirteen years old, his mother decided to give their green Amazon parrot to the Bronx Zoo. Young Chapin went along, and he never forgot how William

Beebe made them feel that, in giving the parrot to the Zoo, they had done a great service.

When he was fifteen, Chapin was elected to active membership in the Natural Science Association of Staten Island. It was the launching of a distinguished career. From that date onward until he left for Africa in 1909, Jim Chapin's notes on birds and mammals appeared in the little monthly journal of that society.

Chapin's first scientific paper was read before their meeting of October 21, 1905. The future birdman's subject was a captive jumping mouse! It was William T. Davis, a Staten Island naturalist, author of "Days Afield on Staten Island," who became Chapin's early mentor. Davis claimed to be the first subscriber to *Bird-Lore,* now *Audubon Magazine.*

In 1905, Chapin became acquainted with Waldron DeWitt Miller of the American Museum of Natural History. Miller became one of Chapin's dearest friends. They joined in many week-end and holiday field trips, mostly to New Jersey.

From Miller, Chapin received a veritable course in systematic ornithology. Birds were not their only concern for Miller was a naturalist of great learning. During the next few years, the broad teachings of Miller were to stand Chapin in good stead, both at Columbia University and later when he went to Africa.

Chapin had unusual scholarly competence. He graduated from high school when he was only 16. He considered himself too young to go to college and undertook a year's work in the American Museum's Preparation Department before matriculating at Columbia. While at the Museum, Chapin developed a water color technique which later served him well in making field sketches for proposed museum habitat groups of African fauna.

Young Chapin continued his association with the Museum during his first two and one half years at Columbia University, where he majored in zoology. In 1908, shortly after his sophomore year, King Leopold II of Belgium presented the Museum with an ethnological collection from his territory in the Congo Free State. Favorable relations having been established, the Museum decided to send an expedition there to collect animals from insects to elephants, also anthropological material. Herbert Lang, an expert in zoological survey and modern taxidermy, was chosen to lead the Congo expedition because of his previous African experience. In 1906, he had "gone in" from Mombasa on the east coast.

Chapin, a Columbia junior of 19, was invited to join Lang. He decided to postpone college and sign up for one to three years in Africa. He spent the next five and one-half years there! Chapin proved indispensable to Lang. He was secretary and remembrancer, besides performing his duties of transport agent for their collections, an ornithologist, mammalogist, ethnologist, carpenter, and tinsmith. To the Congo natives, Chapin was, "Mtoto na Langi" (Lang's son). Their fondness for each other could have been no greater had they been father and son.

On May 8, 1909, Lang and Chapin sailed for Africa. For Chapin, the date was the beginning of an official affiliation with the American Museum that was to extend, up to the present, more than 37 years. During his first five and one-half years in the Congo, Chapin collected more than 6000 specimens of birds, the largest single collection that had yet been made there. Traveling across the width of the colony's 910,000 square miles, he observed birds along a route of 1800 miles.

Chapin's keen observations on African birds called attention to a heretofore little-known phenomenon; that some birds migrate regularly even though they nest close to the equator. This led him to conclude that the migration of birds in the tropics offered devastating evi-

dence against the theory that bird migration first developed in response to the Ice Age of the North.

At Avakubi, a rubber station in the Ituri forests 1200 miles from the mouth of the Congo River, they established their base camp. It was one of the hottest, steamiest places on earth. Chapin's first attack of malarial fever came just three months after he entered the Congo. It was his worst. He took 8-10 grains of quinine every other day.

It was in the Congo that Chapin formed the habit of drinking six or more cups of strong coffee every day. At first, he drank coffee to buoy himself up after a malarial attack. But presently he felt that he did better work under its stimulus. Today, he likes to have guests in his Museum office join him in what he calls, "the luscious brown infusion," brewed in silver-plated filters brought to America from a cafe in Belgium.

Often, while he was applying arsenic to bird skins, Lang and Chapin's good friend Dr. Joseph Baequert, a Belgian entomologist, accused him of absentmindedly sprinkling arsenic in his coffee and drinking it without ill effect!

Besides their zoological mission, Lang and Chapin were to learn all they possibly could of the natives and gather material for a habitat group for the Museum depicting Pygmy life. The Pygmies were the first to contribute to the valuable collection of 100 casts of 16 different tribes of central African races.

Chapin, who became an excellent linguist, spoke French, and two of the four Congo dialects—Lingala and Kingwana; besides the Swahili of east African tribes. He addressed the first Pygmy they saw, explaining they would like to reproduce his face by covering it with a layer of "soft white mud" (plaster of Paris). Although obviously frightened, he suggested that he would like to see the "mud" on his hand or foot. The completed cast aroused his admiration. Thereafter, they had less difficulty taking casts.

Emandinia, Chief of the Nala Pygmies, exhibited complete calm while having his cast taken. In reply to compliments on his fearlessness, he said that fear was needless for, "Were not the white men alone, and Emandinia supported by 100 well-trained archers?"

It was at Medje, nine days march from Avakubi, that Lang and Chapin sought the okapi, a strange, giraffe-like animal unknown to science before 1901. Apparently the okapi had escaped discovery for so long because it lived in the only retreat white men were forced to respect, a country then acknowledged as one of the most unhealthy in the world.

After six months of hardship in this gloomy, dank forest, they obtained specimens of the okapi and materials for a Museum habitat group. But it was not until 1937 that the first live okapi came to America, largely through the efforts of Chapin. In that year, he learned from a Russian friend, who had been in Africa, that four male okapis were in captivity at the Mission of Buta in the Uele District.

Chapin offered to negotiate with the Belgian government to get one of the animals for Dr. Blair, Director of the New York Zoological Gardens. An offer was accepted by Belgian officials to deliver an okapi to Antwerp. There Dr. Blair received the animal and brought it back to New York. It was the first live okapi to cross the Atlantic Ocean, and is the only captive one in America. It has now been in the New York Zoo more than nine years and is still in good health.

The discovery of the okapi in 1901 is paralleled by one of the most dramatic pieces of zoological detective work in Chapin's long and interesting career. When Lang and Chapin first went to Africa, they encouraged natives to collect birds and mammals for them. But some of them developed the disheartening habit of eating the specimens, or of pulling out the choicest bird feathers to

decorate their hats. So it became customary for Chapin to examine feathers worn by natives in the hope of discovering new birds.

In 1913, Chapin plucked a strange barred feather from the hat of a native visiting the post of Avakubi. It had obviously come from some large jungle fowl, but it was unlike any feather Chapin had ever seen. The natives could tell him nothing about the bird from which it had come.

But the memory of that unknown feather stuck in Chapin's mind for 23 years. Search as he might, he could not find the mysterious owner. Work in eleven museums in Europe and five in the United States failed to reveal a matching feather in their bird collections.

Then in 1936, Chapin made his discovery which David Bannerman, an English ornithologist, has ranked with the finding of the African green broadbill in 1908 as ". . . two of the most remarkable zoological discoveries which have taken place in Africa during the past fifty years . . ."

In July 1936, Chapin sailed for Belgium to continue his work in the Congo Museum on the second volume of the "Birds of the Belgian Congo." One day his route through the Museum took him past a hall that had formerly housed the Congo birds and through a corridor he had never before entered. There his eye fell on two mounted pheasants standing on top of a cabinet. On one of the birds he recognized the counterpart of the feather that he had found in the Congo forest 23 years before.

In November 1936, Chapin's article describing the bird appeared in a Belgian scientific journal. The bird was named *Afropavo congensis,* the Congo peacock. The following summer of 1937, Chapin returned to Africa for the fourth time. Following an excellent clue, he re-entered the Upper Congo forests and succeeded in getting several specimens of the little-known bird.

Then history repeated in a whimsical fashion. Like his bat-catching hawk, collected 25 years before, his Congo peacock specimens held other kinds of life. Chapin is greatly amused that of four species of bird-lice found on the creatures, three were unknown to science and one was later named for him! But the amazing thing about Chapin's discovery was that no one had suspected that a relative of the peacock, a native of Burma, India and Ceylon—would be found in Africa. It was one more unexpected link between the birds of Africa and the Orient.

Early in 1915, just after the outbreak of World War I, Chapin returned to the United States from his first African trip. He re-entered Columbia University to finish his junior year, already delayed six years. Chapin graduated in 1916, then began graduate work for a master's degree. When the United States declared war in 1917, Chapin enlisted. He was trained for the infantry, but when it was discovered he spoke French, he was sent as a billeting officer to France, As Chapin puts it, he was "peacemaker between the American Army and the French civilian."

Chapin's second trip to Africa came in 1926. The American Museum of Natural History again sent him to Africa as head of the Ruwenzori-Kivu expedi-

Forest habitat of the okapi.

tion. The main purpose of the trip was to become acquainted with as many mountain-dwelling birds as possible. From March 1926 to August 1927, Chapin ranged from east Africa's big-game fields to the Ruwenzori Mountains. He collected almost 2,000 specimens of birds and reached 15,400 feet on the western side of Mount Stanley.

In July 1930, Chapin returned to Africa a third time to obtain materials for a habitat group of birds of the Congo forest. During a stay of eight months near Lukolela, in the border region of the equatorial forest, he collected more than 600 birds besides the vegetation needed for the group.

It was in 1931 that Chapin received one of the highest honors of his career. The late King Albert of Belgium honored him with the "Ordre de la Couronne." It was in recognition of his zoological research in the Belgian Congo. In 1935 there were more honors when the National Academy of Sciences awarded him the Daniel Giraud Elliott Medal for his distinguished work on the first volume of his "Birds of the Belgian Congo;" in 1934, he succeeded his boyhood mentor, William T. Davis, as President of the Staten Island Institute of Arts and Sciences; and in 1939, he was elected President of the American Ornithologist's Union.

In 1942, war again claimed Chapin. Because of his knowledge of Africa, the Office of Strategic Services dispatched him on a mission there. En route, he did trouble-shooting for the U. S. Army Air Forces based on Ascension Island in the mid-Atlantic. Thousands of sooty terns breeding there were colliding with ferrying planes alighting and taking off on their way to Africa.

When Chapin arrived, he found the Army slaughtering vast numbers of terns in an effort to drive them away. Popular belief held that killing the birds was the only solution, for if the nests were broken up, the terns would only return to lay a second set of eggs. But Chapin staked out a plot in the middle of the breeding colony and removed several hundred eggs. Only a fraction of the birds returned when they found their eggs had been removed. The Army then began destroying eggs systematically along the plane runways, and gradually the terns left. Thus the adults, discouraged from nesting, were saved from destruction and lived to lay again elsewhere.

The young okapi of the Congo.

Sitting in Chapin's quiet office, one would little guess at the adventure that has filled this man's life. Today at 57, he has the same zest for life and for a good story. Although his hair and close-cropped mustache are gray, his blue eyes are as keen and humorous as ever and his tall frame moves with easy grace. And if you mention Africa, his eyes will gleam with enthusiasm and the unquenchable fires that this fascinating country has always lit in the hearts of those who have dwelt there.

But if Chapin has a specialized knowledge of African birds, he is equally at home with American birds. One of his greatest pleasures are Sunday field trips with his wife to study birds in the New York City region. Mrs. Chapin is a capable ornithologist and an excellent observer. Chapin, whose hearing has always been somewhat impaired, admits that he depends on his wife's keen hearing to discover birds that he might otherwise miss.

One of Chapin's most admirable char-

acteristics is his perennial cheerfulness. It is coupled with a fine sense of humor and a flair for telling droll stories. These qualities have made him popular wherever he has gone. Recently, his secretary paid him a great tribute. She said that Leigh Hunt's "Abou Ben Adhem," in which Ben Adhem's humaneness to his fellow men, placed him first on the list of those blessed by God, describes Chapin perfectly. She says Chaps surmounts all obstacles because he *thinks right.*

Chapin's cordiality and disarming manner have won him many friends, none of whom he ever forgets. He has an enormous correspondence and is very prompt in replying to letters. His scientific associates at the Museum think one of Chapin's great contributions to the advancement of natural science lies in his personal charm. He is a powerful force for public relations. Museum staff members are agreed that Chapin has probably helped the Museum's public relations more than anyone else.

Chapin is both an example of scientific achievement and of huge personal success. By his eternal optimism and helpfulness to others, he has contributed to the happiness of those around him. And Chapin, by his own countenance, is a happy and contented man. Yet, like many others, a part of him was surrendered long ago to Africa. His old friend Carl Akeley lies buried on a mountain side in the lovely Kivu section which he once described as "the most beautiful country in the world." When Chapin speaks of the long chain of mountains, of the lakes and forests of Carl Akeley's gorilla country, his deep voice grows a trifle wistful. Perhaps someday he will go back.

But if Africa made a lasting mark upon Chapin, he has also left his impression deep upon that great country. For so long as men shall go to Africa seeking wilderness adventure, they will find birds and other creatures there bearing the Chapin name.

Looking down into Butagu Valley from Mt. Iterere in the Belgian Congo.

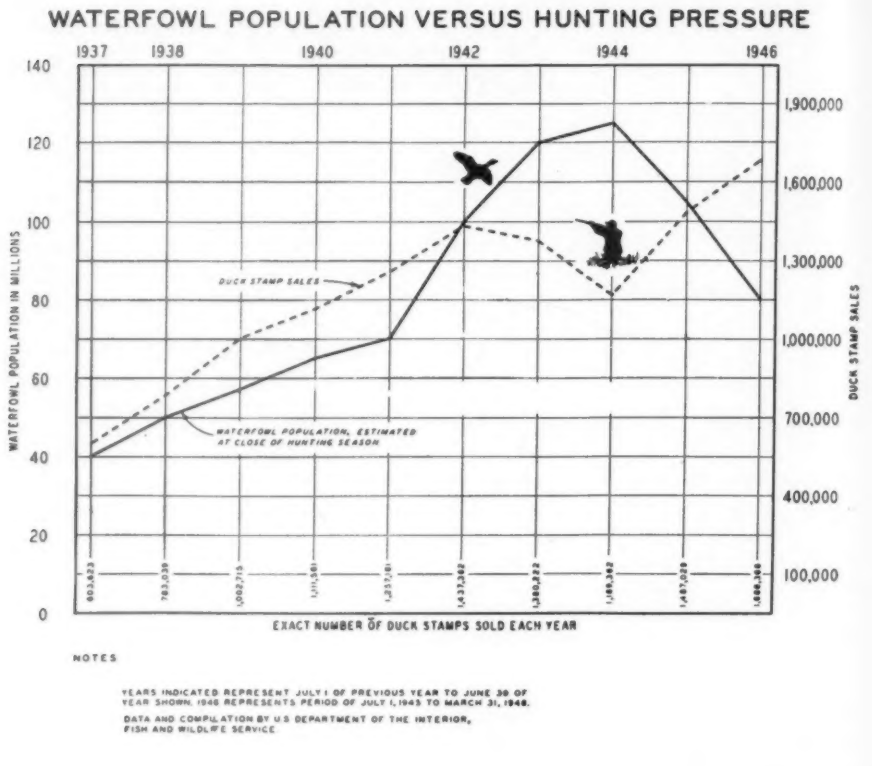
THE PRESIDENT'S *Report to You*

THE federal waterfowl hunting regulations for this year will have been publicly announced before this issue of the magazine appears. You will remember that in March your Society recommended to the federal officials that, in view of the alarming decline in continental waterfowl supply and the great increase in hunting pressure, appropriate action be taken—before it might be too little and too late—to assure preservation of an adequate breeding stock; that it seemed to us that the open season might well be limited to 30 days as contrasted with 80 days last year, the bag limit cut in half from 10 to 5, the possession limit made equal to the bag limit as contrasted, in recent years, with double the bag limit. We also advocated restoration of the 4 p.m. closing time instead of sunset and the placing of a closed season on the wood duck, except in those southeastern states in which it is still common.

Recent observers on the duck breeding grounds in the prairie provinces of Canada appear to be agreed that there is every evidence that this will be a rather disastrous year as regards crop of young waterfowl in that vital area. Response of the press to our March release was very favorable, demonstrating widespread recognition of the need of restrictive action this year and public support of such measures as may, in the federal government's wisdom, seem necessary for the benefit of the waterfowl and assurance of avoidance of further depletion of breeding stock.

The accompanying chart, recently released by the Fish and Wildlife Service, clearly indicates the nature of the supply and demand problem involved. In his accompanying statement, Mr. Day, Director of the Service, points out that the number of waterfowl has dropped 36 per cent in the two years since the count in 1944, whereas the number of duck and goose hunters, as evidenced by the figures on duck stamp sales, has increased in that same two years by 44 per cent. "The only quick means of adjusting hunting pressure" Mr. Day stated, "is provided through the annual migratory waterfowl hunting regulations. . . . It is going to take the best kind of management possible to prevent further cuts into the breeding stocks of waterfowl."

We have not cited (except by representation on the chart) the total waterfowl population estimates publicly given out by the Fish and Wildlife Service, as we are not inclined to feel that they have reliable basis. The chart curve would not be altered if count rather than estimates were used. Elsewhere in this issue you will find an article by Dr. Lincoln in which he clearly portrays how the Service goes about its annual task of counting and estimating the continental supply of waterfowl. It is our belief that the Service would be wise to limit its statements to the figures of actual count, and to stress particularly the trends from year to year as expressed in percentages of change. The actual counts produce far smaller figures than the published estimates of total popula-



tion. Those estimates are based upon a multiplication formula, the validity of which we do not believe susceptible of proof, and it seems to us probably excessive in amount. The percentages of change in counts, however, taken, generally speaking, by the same persons in the same areas at the same time in successive years, seems to us to furnish reasonably sound basis for regulating the take in accordance with supply and demand. The figures on duck stamp sales strike us as a dependable basis for figuring the demand.

The slaughter of Canada geese at the Horseshoe Lake State Refuge in southern Illinois has reached such proportions in recent years as to seriously threaten the survival of those geese in that flyway. As a consequence, the federal government announced in April that no shooting of geese would be permitted in Alexander County, Illinois, during the coming season. It is questionable whether this action goes far enough. The Waterfowl Committee of the Outdoor Writers' Association of America, members of which are in a position to know what has been happening to Canada geese in that flyway, contend, and we support their view, that the season should be closed on Canada geese throughout the Mississippi flyway during the coming season, and not simply in Alexander County, Illinois.

POLICY ON ANIMAL CONTROL

In this column, in the last issue, we called attention to the fact that there is agitation again in California for control

of sea lions. It may not be amiss for us to restate the policy of the National Society on control of any animal population. We do not believe that continuing control of any species is justifiable. We grant that, locally and temporarily, any species may occur in such disproportionate abundance as to justify local and temporary control by duly constituted authorities, after competent scientific investigation has demonstrated the need and wisdom thereof.

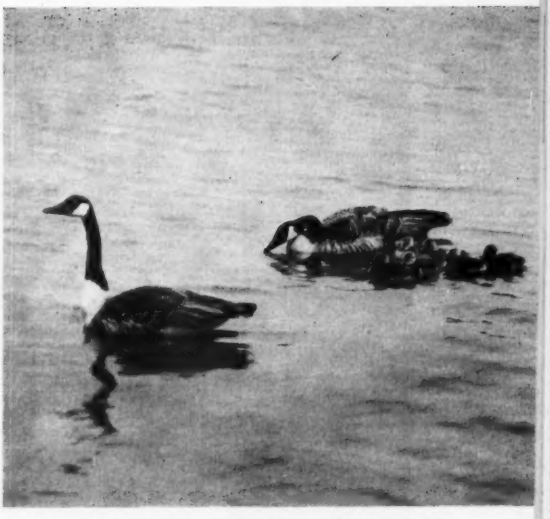
We are opposed to the taking of such control measures by individuals or groups other than the duly constituted authorities, such as those bureaus of the federal government and departments or divisions of state government whose responsibility such measures may be, under existing federal or state law.

There are more or less constant attempts made in the several states to institute control measures affecting this or that species of animal; this is attributable to ignorance of the part played by those animals in the intricate web of balanced life, the maintenance of which is of greatest benefit to mankind.

When it comes to marine animals, other instances of demands for control come to mind, affecting such species as pelicans, cormorants, seals and gulls. Usually the request to control originates with fishermen who either think that the animals are competing with them for a living or object to their tearing nets. In rarer cases the complaint has to do with such matters as noise, odor and the deposit of filth. Patently, cases in this last category are of strictly local and temporary character.

If our opinion were requested by the California Division of Fish and Game, we would recommend to it that it not yield to any clamor for control measures without first assuring itself of the need and wisdom thereof as a result of the findings of a competent scientific survey.

Apparently members of its staff have in the past made investigations of the sea lion "problem" in California, and have as a result come to the defense of the sea lions. With this record on its own books, we would assume that the Division of Fish and Game would wish to be particularly careful not to authorize or proceed with control measures without certainty of ample justification.



Canada geese by Allan D. Cruickshank.

Mounted stellar sea lion.
Photograph by the American Museum of Natural History, New York

Lumbering in a National Forest. (U. S. Forest Service photograph).

PRESSURE OF EXPLOITATION

We face in this country today the prospect of many continuing attempts to encroach upon existing national parks and monuments with commercial operations, and the proponents are evidently not going to hesitate to advocate these intrusions on the grounds of needs of war veterans. The veterans' housing program is offered as the reason for the latest attempt to gain entry into the Olympic National Park for logging.

This claim is a snare and delusion. Some 630 million acres of the United States is in forest—or approximately one-third of our land area, exclusive of Alaska. Of this, the national park system contains 1.1 per cent, or some 6.9 million acres of forest. In Washington and Oregon alone, according to an authoritative article published in the January 1946 issue of the *West Coast Lumberman*, there is enough commercial stumpage to build 73 million five-room houses—or almost two houses for every family in the nation.

Last March, Governor Mon C. Wallgren of Washington publicly announced his forthright opposition to opening up any part of the Olympic National Park to lumbering operations. This Society telegraphed congratulations to the Governor for his leadership in resisting such efforts to break down the maintenance of the inviolate character of our outstanding national areas of inspirational, recreational and scientific value.

On May 29th, however, Senator Warren G. Magnuson of Washington introduced a bill "to exclude from the Olympic National Park certain privately owned lands which were added thereto by Executive action." Section 2 of this bill (S. 2266) reads as follows:

"After the date of enactment of this Act the lands described in the first section of this Act shall be administered by the same agency or agencies by which

they were administered prior to the issuance by the President of Proclamation Numbered 2380 of January 2, 1940, and shall revert to the status which they occupied prior to the issuance of such proclamation. Notwithstanding any other provision of law, no officer of the Federal Government shall hereafter have any power or authority to add such lands or any part thereof to the Olympic National Park."

The bill has been referred to the Committee on Public Lands and Surveys, of which Senator Carl A. Hatch is Chairman. The purposes of this bill seem to us thoroughly undesirable, and we encourage you to advise the Chairman of the Committee and Senator Magnuson of your attitude, if the Congress be still in session at the time you read this column, or if a comparable bill be introduced at a later session.

It is a fortunate circumstance that Governor Wallgren is strongly opposed to such legislation and has stated that, if necessary, he will make a special trip to Washington, D. C., to register his opposition. The Governor has many friends in the Congress, of which he was for many years a valued and highly respected member.

CHECKING ON DDT

Last year, Richard Pough of our staff, in collaboration with representatives of the Bureau of Entomology and the Fish and Wildlife Service, spent some six weeks in Pennsylvania observing the effects on bird life in certain tracts which had been sprayed by plane with DDT solutions of varying concentrations. This June, he returned to the same tracts to make follow-up observations. His preliminary, incomplete report tells us that

(1) On the area where DDT was distributed at the rate of one pound per acre a year ago, the breeding bird population appears to be normal, as it

Scene in the Olympic National Forest — Washington state.

was found to be shortly after the spraying in 1945;

(2) On the new area where DDT was distributed at the rate of one pound per acre early this spring, the breeding bird population appears to be normal;

(3) On the area where DDT was distributed at the rate of five pounds per acre a year ago, the breeding bird population now seems to be only about 20 per cent of normal; it was found practically wiped out just after the spraying in 1945.

This is bad news, indicating that the lasting effect is very substantial where heavy concentrations of DDT are employed. The degree to which the effect is sustained seems surprisingly great in view of the relatively small size of the sprayed tract and the existence of normal breeding bird populations in nearby unsprayed areas, from which inflow would be expected in a reasonable period of time.

Water hyacinths. Photograph by the American Museum of Natural History, New York.

WEED KILLER 2.4.D

The threat of adverse effects of sundry chemicals increases. A new "weed killer," known as 2.4.D, is now available and plans were afoot in the late spring to use it, for example, in killing water hyacinths clogging canals in Florida. It is a hormone poison and the amounts necessary to use are so small that the chances are—though we cannot be sure as yet—that its use will not have direct killing effect upon animal life in the canals. Damaging effect, however, on other plant growth in those canals would doubtless occur, and the indirect effect of such change in the vegetative association would doubtless be considerable. Moreover, it appears that the hyacinths, when treated with this poison, sink to the bottom and in their disintegration may be expected to release chemicals that might well have a direct poisoning effect on some of the animal life. So, you see, there is constant need of watchfulness and of scientific investigation to obtain the facts, in order that the adoption of damaging policies may be avoided.

SUMMER SESSIONS A SUCCESS

By the time you read this, three of the five summer sessions in both the Camp in Maine and the Center in Connecticut will have been completed. In spite of continuing difficulties connected with the supply of food and transportation, the attendance has been excellent. Through these teacher and youth leader training demonstration projects, your Society is making a valuable contribution to nature and conservation education. The influence of Camp and Center ramifies widely and is constantly encountered throughout the nation by members of the Society's staff in the course of their travels on Audubon affairs.

By the end of this season, the eighth of operation, some 1700 persons, coming from almost all states of the Union, will have attended the Camp. We shall look forward to comparable volume of students at the Center when we shall have succeeded in completing the necessary installations to enable the Center to operate at equivalent capacity.

The Audubon Camp in Maine. Photograph by A. D. Cruickshank.

WE EXPECT TO SEE YOU IN OCTOBER

Our annual convention will be held October 19-23. There will be a Camp and Center reunion on Saturday night, October 19th; a gathering at the Center on Sunday, the 20th; informative and entertaining programs on Monday afternoon and evening, the 21st, and on Tuesday afternoon, the 22nd; the business meeting for members on Tuesday morning, and the annual dinner that evening. Printed programs giving full details will be mailed to all members late in September or early in October.

FRENCH REPRESENTATIVES VISIT AUDUBON SANCTUARIES

In June there arrived in this country three representatives of the French Foreign Office, Messieurs Georges Olivier, Albert Jeannin and Yves de Daruvar, to study conservation organization and practice in the United States. It was your President's privilege to take these gentlemen on a personally conducted tour of the Society's Texas coastal sanctuaries, which were in June at their height of seasonal use by the nesting water birds. Our friends of the Houston Outdoor Nature Club and others on the Texas Coast outdid themselves in extending hospitality. The Frenchmen proceeded to Chicago to confer with officials of the National Park Service and the Fish and Wildlife Service, and go on from there westward to visit many of the national parks and wildlife refuges. They will submit recommendations to their government as to organization and administration of conservation matters, especially with relation to French Colonial Africa.

BIRDING IS A SPORT

By Bartlett Hendricks

In recent years some of the most expert ornithologists have been decrying the increasing popularity of that form of ornithology known as "birding"—the building of lists of species observed. They have condemned the emphasis on the earliest date of arrival and the latest of departure, the stressing of accidental visitors and casual winter residents, and they have dismissed "Century Runs" and dawn to dark endurance trips as ornithological madness.

The criticism, offered in a good humored, paternal sort of way, must be given with tongue in cheek, for how else can we explain the inconsistencies in the experts' arguments?

1. A good many of our experts are not above enjoying "birding," and what's worse, of shamelessly admitting it.
2. It can be demonstrated that birding is of far-reaching significance to the science of ornithology.
3. Many who are among our most enthusiastic birders make no claim that what they do is of scientific value—they regard birding as a sport, and they no more expect to have to offer scientific justification than would a golfer or a tennis player.

Of course the professionals are right; considering the expenditure of so much physical energy, the mental tribulations and the profound weakening of the moral fibers, birding affords ornithology returns which may appear relatively meager.

However, if there is any one thing an undertaking needs it is a beginning, and I do not hesitate to say that an appreciable proportion of American ornithologists, as well as some scientists in other branches of biology, got their first awakening of a serious interest in natural science by just such a silly occupation as getting up at 4 A.M. to find the first yellow warbler of the season, or of chasing madly through a bog in a vain effort to flush an illusive Virginia rail and run the day's list up to a soul-satisfying, if scientifically barren, eighty.

The fact that there are field ornithologists who never will go beyond the listing stage, or who even have no desire to do so, is no argument against listing; the records of these ornithological pagans are of some value, particularly in furnishing data on migration routes, distribution and yearly population fluctuations. More significantly, no one thing has done so much to increase the standard of field identification. Skill has risen so high that today species are being identified correctly which only recently were considered impossible of recognition except in the hand, and then only by an expert of long experience with skins in one of the larger collections.

Further, listing, by giving yet another outlet to the American competitive spirit, has resulted in birding becoming a sport of wide appeal, and this has not prevented the growth of ornithology as a science but rather has provided an acceleration by being the means of introducing it to some who were later to be numbered among its most able supporters, but who might never have tasted the cake had they not first been attracted by the frosting.

The professionals, some of them, feel dubious about all this; they would prefer that we determine what a blue jay feeds its young, or whether baby orioles yell bloody murder forty times a minute or only thirty-nine. We should do such things, and some of us are devoting increased time to research. But how many novices would have the patience, the enthusiasm and the skill for such serious work without first learning indispensable facts of field identification, habits and local distribution?

To the advanced worker, research can be as stimulating as any sport or study, but to most beginners it is likely to seem as dull as it is apparently useless.

Field identification and its invariable companion, listing, are the start of building an interest in and a knowledge of ornithology, and may eventually lead to participation in such varied but related fields as zoology, botany, ecology, geology and even photography.

Without the conscious effort of anyone, and despite the mild disapproval of leading professional ornithologists, the science has nonetheless had deposited on its doorstep a lusty and by no means wholly unwelcome offspring—a sport that for competition, exercise, mental stimulation and unadulterated fun, can hold its head high in the company of any sports.

Handicapped by an inapt name and often ridiculed in much the same manner as was golf thirty years ago, birding has enjoyed, though on a smaller scale, the same remarkable upward surge that has come during the present decade to such participation sports as golf, skiing, badminton, fancy skating, skeet shooting and a number of others. Unquestionably, now the war has been won, there will be more Americans than ever taking part in these sports.

I have participated in a majority of sports. In some I have done reasonably well, in most I am invariably striking out, landing in a sand trap or snagging my line on a branch, but I have always enjoyed the sport and the exercise and companionship that accompany it. No sport has proved any more satisfying to me than birding and, too, I have derived much quiet pleasure from poring over old records and recalling the skinned shins, wet feet, the laughs and disappointments that accompanied the gathering of them.

If we really took much stock in that old chestnut "comparisons are odious," man would still be scampering about in Tertiary bliss, and little else, for if we did not compare what we had with what we might have at the expenditure of a little physical and mental effort, the world would have seen little progress.

If we list the benefits to be obtained from some of our leading participation sports—such as golf, tennis or fishing, as well as other factors likely to affect our activity, then we can compare birding with them on a numerical scale of, for example, 1 to 4 values. The resulting totals will not prove that one sport is superior to another, for each person's evaluations will differ and no one not an inhabitant of an ivory tower would be so dogmatic as to claim that the various points considered were all equal.

But we can have some harmless fun by comparing birding with one or more popular sports, and a number of us and certainly some of our now scornful friends will perhaps gain a better appreciation of the advantages that birding can offer as a sport for people of all ages and of every walk of life.

First we must consider the real, the underlying, reason as to why we actually participate in and enjoy a given sport. Some of the headings we might list could include Competition, Availability, Length of Season, and Social and Business Benefits. Other factors affecting a sport would be Time Utilization, in which no recreation can excel birding, filling as it does any portion of spare time, Exercise, Mental and Spiritual Stimulation, Companionship, Cost, and two points which may require a bit of explanation—Exercise Suitability and Exploration Rating.

Some sports offer such concentrated exercise that they are not suitable, or are actually harmful, to older persons and people in poor health. And one bowling alley or tennis court is much like another, but a golfer invariably gets a stimulus out of playing a strange course just as a fisherman enjoys whipping an unfamiliar stream, or a birder exploring territory new to him, and hence the opportunity for exploring new horizons is a definite factor increasing the appeal of a number of sports.

After you have chosen all the points you feel significant, you will find it enjoyable to make your comparisons and total your scores. Regardless of the selections, or the person making the rating, the resulting summary will demonstrate that birding scores high as a sport. Even one who knows little about it can scarcely avoid arriving at a result which will surprise him.

All this will not prove that one sport is superior to another, or that birding is the best sport, for there is no "best" sport. Nor will the rating have manifested the *fun potential* of birding, but it will have demonstrated that birding has come of age as a sport that warrants the consideration of all who love the out-of-doors and who thrill to a red-blooded game, and who want a lifetime recreat on that will bring the pleasures and pulse quickening thrills inherent in any great sport.

(In a concluding article some of the problems confronting birding as a sport will be discussed.)

The NATURE of THINGS

Comments on the new Nature Literature —

By Richard H. Pough

OUTDOOR ADVENTURES

GETTING TO KNOW THE BIRDS

By C. S. Bayne, illustrated by Ralston Gudgeon, William Collins Sons & Co., London and New York, 1944. 7½ x 9¾ inches, 102 pages, 19 color plates. $2.75.

Mr. Gudgeon's water colors of common British birds are most attractive and decorative, and remind me a little of the work being done in this country by Athos Menaboni. The paintings are well reproduced by color lithography and are full page size. The text consists of interesting and amusing

personal experiences which Mr. Bayne has had in the field with the 19 species that are portrayed.

JUVENILES

TURTLES

By W. S. Bronson, Harcourt Brace & Co., New York, N. Y., 1945, 6¾ x 8½ inches, 60 pages, illustrated. $1.75.

This is the eighth in Mr. Bronson's series of natural history picture books. Each page has one or more black and white drawings illustrating elementary facts about turtles and how they live. The simply worded text is printed in large type and is often worked into a full page picture. These are excellent books for teaching natural history to small children.

BIRDS AND HOW TO DRAW THEM

By Amy Hogeboom, The Vanguard Press, New York, N. Y., 1945. 7¾ x 8¾ inches, 39 pages, illustrated. $1.00.

The author has picked out 9 rather different birds and after showing a photograph of each, gives simple step by step directions on how to construct a recognizable drawing of each. A page of text on each bird is placed opposite the photograph. It is designed for a child who is just learning to draw.

WHAT BIRD IS IT?

By Anna Pistorius, Wilcox & Follett Co., Chicago, Ill., 1945. 10⅛ x 8¼ inches, 24 pages, 24 colored illustrations. $1.00.

Each page of this book carries a picture of some common bird in its usual habitat. The paintings are well done in full color and set into each is a small block of text telling a few things about the bird. It is arranged as a quiz book with all the bird names in the back. Small children should thoroughly enjoy this very attractive simple bird book.

ANIMAL STORIES

RAFFLES—THE BIRD WHO THINKS HE'S A PERSON

By Zetta & Carveth Wells, G. P. Putnam's Sons, New York, N. Y. 1945. 5¾ x 8½ inches, 130 pages, 16 photographs. $2.00.

The Wells' obtain Raffles, a buffalo mynah, as a nestling in Malaya. This book is the story of their experiences with it. Mynahs have great potentialities as pets and talking birds but few people have the time and patience to bring them out as fully as has Mrs. Wells. Few birds have ever become as celebrated as Raffles who has been used in both motion pictures and radio. An avian psychologist would undoubtedly interpret Raffles' behavior somewhat differently but the Wells' story is a most interesting and amusing one.

UP ABOVE AND DOWN BELOW

By Irma Weber, William R. Scott, Inc., New York, N. Y., 1943, 6⅜ x 7⅝ inches, 32 pages, 15 pictures. $1.25.

This is a picture book for very young children, which presents the elemental facts about plants. The simple pictures show both the top and the root system of a series of common plant types. On the page facing each picture there are from one or two to several lines of explanation.

KRARK

By W. Kenneth Richmond, George Routledge & Sons, London, 1945. 5 x 7½ inches. 187 pages, illustrated with photographs. 7s. 6d.

This story is about a carrion crow. Starting with his crow as a nestling Mr. Richmond has constructed a very readable tale about its adventures and life in the wild. As is almost inevitable in the telling of such a tale, the author indulges in considerable anthropomorphising. He appears to know his crows though and the story does give one a good picture of the behavior, life history, food habits and general characteristics of the British carrion crow.

ADVENTURES IN BIRD PROTECTION

By T. Gilbert Pearson

Famous informal history of the fight for wildlife conservation during the past four decades by one of the founders of the National Audubon Society.

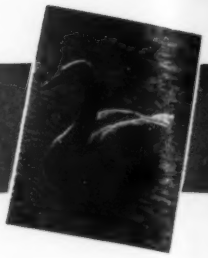
Original $3.50 Edition now $1.98

Write For Free New Catalog of 100 Famous Nature Books at Reduced Prices

Dover Publications

1780 Broadway, New York 19, N. Y.

The Changing Seasons



By Ludlow Griscom

SPRING was late and dry in California, particularly, around San Francisco, where birds were in poor numbers, relatively quiet, with a trend towards late nesting.

Spring came very early in the southern states with a rapid departure of the winter residents. April weather provided the necessary contrasts on the Texas coast, resulting in an excellent migration with many rarities. Uniform conditions caused a disappointing season on the Gulf coast of Florida. In both areas a number of the tropical American migrants arrived relatively early in March.

In the eastern states March was, for the second year in succession, extraordinarily warm, a condition of affairs which persisted into April in the central states. May was cool with relatively uniform temperature conditions. Observers from most of the country reported a disappointing migration due to advanced vegetation and a general lack of pronounced waves of migrants. Observers in the northern Atlantic states fared better than the interior in this respect. For once, the peak flights between New York City and Massachusetts were surprisingly synchronous. It is really astonishing how seldom events around New York are duplicated near Boston a day or two later.

The great flight of snowy owls lingered northward into mid-April and stragglers were recorded in early May in Massachusetts and Michigan. The horde of evening grosbeaks in the Atlantic states lingered to mid-April southward, to mid-May northward, with stragglers to May 29 in eastern Massachusetts. Those who recall the irruption of purple finches last winter to the central Gulf coast states will not be surprised to hear of a heavy spring flight in Missouri, Illinois and Ohio.

Southern herons—spring records from New York, Massachusetts, Ohio and Illinois, as usual in recent years.

Geese—Canadas in good numbers in the Atlantic flyway, seriously down in the Mississippi flyway. Snow geese are now recorded annually in New England. The eastward trend of the blue goose was not continued.

Ducks—A sharp and serious decline practically throughout the country, the more experienced estimates 35-50% off, according to locality. In Massachusetts, even such common species as the black, scaup and golden-eye were badly down in numbers. In the interior the chief complaints were over the diving ducks, and the poor stupid redhead seems to be in serious trouble again. The wood duck continues its downward trend in the Northeast, particularly significant in Massachusetts where there has been no open season.

Raptors—Few reports of any significance. A surprising number of migrating goshawks in Massachusetts. Little is on record about migratory flights of the turkey vulture. A flyway has been discovered along the San Gabriel Mountains in southern California; the migration began in mid-February and lasted into April, with a peak of 800 birds in one day.

The increase of sandhill cranes continues in a most gratifying manner. A gathering of 50,000 was reported along the Platte River in Nebraska last spring, surely one of the great sights in the wildlife of the continent.

Shorebirds—Snipe still badly down. Woodcock definitely increasing in parts of the Northeast. A fine spring flight of

shorebirds throughout the continent. For the first time in these columns, it is safe to report a definite population increase in the upland plover, which failed to respond to the closed season as most of the species did. The Hudsonian curlew is another large species rapidly increasing in recent years. It is now common on the Gulf coast of Texas, and stragglers occasionally alight in the interior. A gathering of 40,000 is reported at Cape Romaine, South Carolina, the greatest number on record in the historical period. The Hudsonian godwit continues to emerge from the shadow of extinction, more than in the past 15 years on the coast of Texas, 5 in Kansas, 2 in Iowa, 1 in South Dakota.

For the first time in the historical period we have spring arrival dates for the black skimmer in Massachusetts. Bachman's sparrow has been having a boom in the states just west of the Alleghanies for some years; this spring it is reported from Michigan and central New York.

Great rarities include a skua off southern California, the hepatic tanager and other "western" stragglers on the coast of Texas, an oyster-catcher in southern New Jersey, Gambel's and Harris' sparrow east to Massachusetts, and an adult West Indian brown booby off Cape Cod after a three-day southerly gale.

SONGBIRD SANCTUARIES

By Roger T. Peterson

With tables of trees, shrubs and vines attractive to birds. 32 pages.

15¢ prepaid

NATIONAL AUDUBON SOCIETY

AUDUBON POST CARDS

Let the yellow-throat, hummingbird, indigo bunting, wood thrush, oriole, tanager, grosbeak, kingbird, catbird or redstart carry a message to your friends. Cards are in color with space on back for message and address. 10 cards—20¢. Add 3¢ for postage. Sets cannot be broken.

NATIONAL AUDUBON SOCIETY

CLASSIFIED

ENTIRE LIBRARIES or small collections of Natural History books purchased at liberal prices. Catalogs issued. *Nada Kramar, Natural History Bookseller, 1906 "K" St., N.W., Washington, D. C.*

24 x 54 BUSCH BINOCULARS FOR SALE. Ideal for waterfowl. Central focus. Strap and carrying case included. New when bought; used less than one year. In excellent condition. If interested send offer by August 15th to *Box B, Audubon Magazine, 1000 Fifth Avenue, New York 28, N. Y.*

NATURE SETS ILLUSTRATED IN COLOR. **Nature Encyclopedia,** edited by Clyde Fisher, 5 Vol., 952 pages, 700 illustrations, 200 in color, $6.00. **Nature Lovers' Library,** 6 Vol., 8½ x 11½, 2000 pages, weight 20 lbs., lives and habits 3000 species fauna, 1000 species illustrated, 300 in color, $19.50. **The Nature Library,** 7 fabrikoid Vol. flora and fauna, 1891 pages of which 288 are in color, $10.00. **Smithsonian Series.** 12 Vol. red Buckram, 5000 pages, 1800 illustrations, $66. (Literature free). Terms: Remittance with order, we deliver free. Full refund for sets returned within ten days. *Literary Mart, 8 East 33rd St., New York.*

BINOCULARS, field glasses, telescopes, repaired, accurately aligned on optical collimator, same week service. Mail instrument for free estimate. Cash paid for broken binoculars, field glasses. *Rochelle Optical Company, Dep't 3, 28 Cliff Street, New Rochelle, N. Y.*

142 DAYS BEFORE
CHRISTMAS BIRD COUNT

Regulations to be Same as Last Year

(See the November - December 1945 issue of Audubon Magazine, or send for mimeograhed copies.)

Dates:

Dec. 21 through Dec. 29

Reprints Available

BIRD CONSERVATION PROBLEMS IN THE SOUTHWEST PACIFIC. 4 pp. 5¢

By Ernst Mayr. (Few Americans are aware of the great and immediate threat to the endemic species of Pacific Islands—send this reprint to your friends at home and abroad in an effort to awaken them to the problem and the need to do something about it.)

OUT OF THE GRAY MIST. 8 pp. 10¢

By Carl W. Buchheister. The life cycle history and conservation of the Leach's Petrel.

SNOBBER-SPARROW DE LUXE. 8 pp. 10¢

By Edwin Way Teale. A human interest story about a city boy and his pet English sparrow.

THE GREAT COMPANIONS OF NATURE LITERATURE. 4 pp. 5¢

A 100 volume nature library selected by Edwin Way Teale.

DEER TROUBLE. 8 pp. 5¢

By Dave Cook. This discussion of the white-tail deer in the Northeast points up a challenging conservation problem.

ROOSEVELT MEMORIAL BIRD SANCTUARY

By John H. Baker. The story of our 12-acre songbird sanctuary at Oyster Bay, Long Island. 8 pp. 5¢

RESCUING AN ISLAND. 8 pp. 10¢

By Millicent Todd Bingham. The story behind the story of the Audubon Nature Camp on Hog Island, in Maine.

IS IT WISE POLICY TO INTRODUCE EXOTIC GAME BIRDS? 20 pp. 15¢

By Ralph T. King. A thoroughly documented discussion of the dangers involved in introducing such foreign species as ring-necked pheasants, Hungarian partridges, etc.

MIND IN NATURE. 4 pp. 5¢

By Alan Devoe. An interesting interpretation of the development of mental life, from primitive organisms to man.

CONCERNING PREDATORS. 8 pp. 5¢

By Dave Cook, illustrated by Walter J. Schoonmaker.

NATIONAL AUDUBON SOCIETY

George S. White & Co., Inc.

116 JOHN ST., NEW YORK 7, N. Y.

Insurance Brokers

Specializing in providing proper coverage and reducing costs for thousands of satisfied customers. Cameras and binoculars insured.

LETTERS

Letter from the Editor:

Audubon Magazine readers really get around. Frequently they appeal to us for advice about good birding areas to visit. We like to answer such letters to the best of our ability.

Do any of you want to help us out? If you can act as a source of information for a region you know well, send us your name and address and the locality about which you can give information. Then when we receive an inquiry which you can answer, we'll refer the inquirer to you.

Don't forget that many good hints about what to see and where are to be found in articles from *Audubon Magazine*. In this issue, Hustace Poor (President of the Linnaean Society of New York) gives you some tips on western habitats, and Maurice Brooks' description of the Minnesota-North Dakota country will make any natureman long to hit the trail. To make things easy, we've just gone through a pile of back numbers and made a list of articles for you. Those marked (M) contain ornithological maps by Roger Tory Peterson. If these issues are not on your own shelves or in your local library, they can be purchased from us. If marked (O), they are out of stock.

Regardless of the price listed for each issue, if you wish to purchase a single copy, send 35¢. Because of cost of handling, orders for 10¢ magazines can be filled only if your order amounts to one dollar or more. Please add 20¢ for postage, if your order is for from 6 to 10 magazines.

Coastal Carolina Bird Trips	(M)	M-A	1935	(0)
Along Maine's Coast	(M)	M-J	1935	10¢
Southern Ontario Birds	(M)	S-O	1935	10¢
Birding in Southern California	(M)	N-D	1935	10¢
Meet New Jersey's Birds	(M)	S-O	1936	10¢
Invitation to Florida	(M)	S-O	1937	10¢
Birding Down Long Island	(M)	S-O	1938	10¢
An Invitation to Central Calif.	(M)	J-A	1939	10¢
Bird Habitats of Salt Lake Region	(M)	M-J	1941	(0)
Above Mt. Rainier's Timberline		J-A	1941	(0)
Grand Mesa Birding		J-A	1943	10¢
Birds of the Louisiana Gulf Coast		M-J	1945	(0)
The Muskeg Farthest South		J-A	1945	(0)
Marvelous Okefinokee		N-D	1945	35¢
Pymatuning		M-J	1946	35¢

• • •

For those of you who collect material on John James Audubon, don't miss the article by Donald A. Shelley on Audubon, the Artist, in the May issue of the *Magazine of Art*, published by The American Federation of Arts in Washington, D. C.; and "Some Notes on the Flowers and Trees in Audubon's 'Birds of America,'" by Helen M. Fox in the June issue of *The Journal*, published by the

New York Botanical Garden, Bronx Park, New York.

• • •

To the Editor:

May I say we all enjoy your magazine. Indeed, we read every word of it—including all advertisements. It is improving all the time. The clever little drawings are so interesting. One of my favorites was "The Bird and the Book." I shall use that some day in our Literary Club.

We all hungrily scan each new magazine to see what there is by Cruickshank. You sent him out here once on a lecture tour. We (The Spokane Bird Club) went "birding" with him and a good time was had by all!

MRS. ARCHIE CLOUGH.

Spokane, Wash.

• • •

To the Editor:

I subscribe to the *Audubon Magazine* way out here in India, because I cannot do without it.

Bird watching is not merely a hobby with me—ever since my earliest childhood days, back in the eighties, on a West Texas farm, bird lore has been a part of me. Then during my thirty-three years in India bird watching has been a daily pleasure. My work takes me to far away villages, every yard of the way revealing some kind of bird.

In my small compound, any day of the year, I can count by sight or sound from forty to sixty species of birds. There are mynahs, doves, pigeons, chats, tits, warblers, shrikes, minivets, woodpeckers, parrakeets, hawks, falcons, vultures, owls, Indian rollers, Indian robins, bee-eaters, babblers, barbets, wren-warblers (of which family is the famous tailor-bird) bulbuls, peafowl, partridges, quail, and many others.

Just a ten minute walk takes me to where the Sutlej River comes out of the mountains, and there I find river terns, skimmers, herons, bitterns, osprey, kingfishers, ring-necked plovers, stone plovers, lapwings, swallows.

The winter brings many migrants from Europe and northern Asia, and from the Himalayas—merlins, hawks, wagtails, geese, ducks, teal, snipe, cranes, storks, many warblers and flycatchers.

When summer vacations take me to a retreat in the Himalayas or in beautiful Kashmir, there are always many other species to search for and to enjoy—the great bearded vulture, the whistling and the laughing-thrushes, the fairy blue flycatchers, dippers, tree-pies, tree-creepers, nuthatches, nutcrackers, pigmy owlet, pigmy falcon—such a richness of avian life, any "one of which in the bush is worth two in the hand."

LENA A. BOYD.

Punjab, India

• • •

BINOCULARS

for greater enjoyment of bird study

BAUSCH & LOMB

Aluminum Body • Coated Optics

6x30 *center focus*		$112.00
7x35 *center focus*		117.00
8x40 *center focus*		140.00
UNIVERSAL *(coated)* *IEA	6x30	$ 85.00
WOLLENSAK *(coated)* *IEA	6x30	72.50
Army field glass	4x40	19.00
Air Guide field glass	4x40	19.00
LEIROP *(French) center focus*	8x30	54.00
HENSOLDT DIENTSGLAS *IEA	7x56	175.00
COLMONT *(Paris) center focus*	8x32	75.00

RECONDITIONED BINOCULARS

BAUSCH Light Weight *IEA	8x30	$ 70.00
BAUSCH & LOMB Navy *IEA	6x30	65.00
BAUSCH & LOMB *center focus*	12x25	40.00
ZEISS *(11" height)* *IEA	10x50	100.00
ZEISS-made DIENTSGLAS *IEA	10x50	125.00
HENSOLDT *center focus*	6x42	125.00
HENSOLDT *center focus*	8x56	175.00

* IEA—Individual Eye Adjustment. Plus 20% Federal Tax

Binocular Repair and Coating Service Estimates Given

Schoenig & Company, Inc.

8 EAST 42ND STREET, NEW YORK 17, N. Y.

OPTICIANS

THE GRIDIRON

"THE BARS DROP DOWN AS THE BIRD BEAKS IN"

G2

Filled with Bird Banquet (BB2)

$1.50

This popular model has returned to the HYDFAMILY in a postwar version with new features. It is made of rust-resistant metal, and is an ideal feeder for Cardinals, Blue Jays, Catbirds, Mockingbirds, etc. Squirrels despise it. Bird lovers endorse it. Individually boxed.

HYDE BIRD FEEDER CO.

SOMERVILLE 45, MASS.

Send for free catalogue

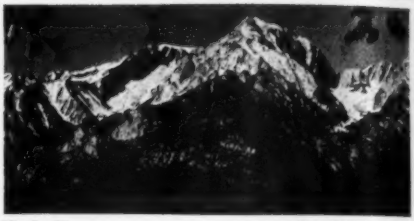
Announcing the 1947 Audubon Calendar

Way in advance of the Christmas rush, here is your Audubon Calendar. A reproduction of John James Audubon's *Summer Red Bird* (Tanagra Aestiva) from the famous Elephant Folio Edition of *Birds of America.*

Set handsomely on fine paper with a scarlet trim, this calendar is suitable for hanging on the walls of home or office. Its beautiful appearance suggests that it would make the perfect Christmas or remembrance gift.

Packed in its own cardboard backed photo-mailer the price is only—$1.10.

NATIONAL AUDUBON SOCIETY
1000 Fifth Avenue, New York 28, N. Y.



High Sierras **Josef Muench**

PHOTOGRAPHS AVAILABLE

Full color and black and white photographs of nature subjects available to publishers and advertisers.

Our files contain large numbers of photographs of birds, mammals, reptiles, flowers and other nature subjects, including a variety of striking outdoor scenes.

Call or write us for nature photographs.

Photo Service Department

National Audubon Society
1000 Fifth Avenue
New York 28, N. Y.
BU 8-2640

Now
for the first time

Color Photographs

Wild birds in full color photographed in their native habitat are now being sold individually. A list of sixty photos on 2 x 2 slides to choose from. Price: 25 cents ea.

WRITE or PHONE

Photo Service Dep't
NATIONAL AUDUBON SOCIETY
1000 Fifth Avenue, New York 28, N. Y
BU 8-2640

While They Last

Hand Colored
and
Hand Engraved

Audubon Prints

The following Audubon Prints, 18 x 22 inches can be bought now at the very low price of $2.50 each.

Plate #1	*Wild Turkey Cock*
•Plate #32	*Black-billed Cuckoo*
Plate #87	*Florida Jay*
•Plate #186	*Pinnated Grouse*
Plate #187	*Boat-tailed Grackle*

• Starred prints are Horizontal; All others Vertical.

Write to: Service Dep't.

NATIONAL AUDUBON SOCIETY
1000 Fifth Avenue, New York 28, N. Y.

Nature Books

Add these books to your library — buy them for your friends as gifts.

- ☐ FIELD GUIDE TO THE BIRDS.. $2.75
  (Eastern Species)
  by Roger Tory Peterson
- ☐ FIELD GUIDE TO THE WESTERN BIRDS $2.75
  by Roger Tory Peterson
- ☐ THE ROSEATE SPOONBILL..... $1.98
  by Robert Porter Allen *(paper bound)*
- ☐ IVORY-BILLED WOODPECKER.. $1.98
  by James T. Tanner *(paper bound)*
- ☐ MODERN BIRD STUDY..... $2.50
  by Ludlow Griscom
- ☐ SON OF THE WILDERNESS..... $3.50
  The Life of John Muir
  by Linnie Marsh Wolfe
- ☐ THE LOST WOODS..... $4.00
  by Edwin Way Teale
- ☐ ONE DAY ON BEETLE ROCK.. $2.75
  by Sally Carrigher
- ☐ WILDLIFE REFUGES..... $4.00
  by Ira N. Gabrielson
- ☐ MEETING THE MAMMALS..... $1.75
  by Victor H. Cahalane
- ☐ BIRDS OF THE SOUTHWEST PACIFIC $3.75
  by Ernest Mayr
- ☐ MAMMALS OF THE PACIFIC WORLD $3.00
  by T. D. Carter, J. C. Hill, G. H. M. Tate
- ☐ NATIVE PEOPLES OF THE PACIFIC WORLD $3.00
  by Felix M. Keesing
- ☐ FLORIDA BIRD LIFE..... $4.25
  by Arthur H. Howell
  (illustrated in color)

Garden Sticks about 2′ tall, brightly colored and handpainted. 6 in a box—$3.95.

NATIONAL AUDUBON SOCIETY

Young People's Shelf

Start building a nature bookshelf now, for the boys and girls who will be the conservationists of the future. Beautifully illustrated by well-known wildlife artists and photographers, this selection is available to you at Audubon House.

- ☐ TRAVELING WITH THE BIRDS $1.50
  by Rudyard Boulton
- ☐ BIRDS AT HOME..... $1.50
  by Marguerite Henry
- ☐ THE BURGESS BIRD BOOK.... $3.00
  by Thornton Burgess
- ☐ THE BURGESS ANIMAL BOOK. $3.00
  by Thornton Burgess
- ☐ "BOY OF THE WOODS"..... $2.00
  The Story of John James Audubon
  by Marie Wells and Dorothy Fox
- ☐ THE WONDER WORLD OF ANTS $1.75
  by Wilfred Bronson
- ☐ THE CHISEL TOOTH TRIBE... $2.00
  by Wilfred Bronson
- ☐ CHILDREN OF THE SEA..... $2.00
  by Wilfred Bronson
- ☐ STOOPING HAWK AND STRANDED WHALE $2.00
  The story of two Indian boys
  by Wilfred Bronson
- ☐ THE GRASSHOPPER BOOK..... $1.75
  by Wilfred Bronson
- ☐ HORNS AND ANTLERS..... $2.00
  by Wilfred Bronson
- ☐ UP ABOVE AND DOWN BELOW $1.25
  A first book about plants
  by Irma Webber
- ☐ WARM EARTH $1.00
  by Dorothy Waugh
- ☐ THE TALE OF THE WHITEFOOT MOUSE $1.50
  by Henry Kane
- ☐ THE TALE OF THE PROMETHEA MOTH $1.50
  by Henry Kane
- ☐ REAL BOYS AND GIRLS GO BIRDING $2.50
  by Jack Van Coevering
- ☐ AMERICAN BUTTERFLIES AND MOTHS $1.00
  by Cecile Matschat
- ☐ STORY BOOK OF ANIMALS AND PLANTS $1.00
  by Stephenson and McGill
- ☐ "WHAT BIRD IS IT?"..... $1.00
  Questions and answers for children
  by Anna Pistorius

1000 FIFTH AVENUE, NEW YORK 28

AUDUBON

Living Memorials

THERE are few normal human beings who have not on occasion dreamed of a memorial which they would like to leave to posterity . . . sometimes in their own names, but more often to keep alive and to share with others the memory of a member of the family circle or of a friend.

GOOD fortune in the choice of such a memorial attends all those who have found pleasure in an understanding of nature, who have known and understood the birds of America, the creatures of the wild, and the great American outdoors. For they have an opportunity to reflect this interest by establishing a *living* memorial, which so long as life endures on this earth, will make its manifold contributions to all mankind.

THE program of the National Audubon Society presents a number of unusual opportunities for the establishment of such living memorials. The officers and directors of the National Audubon Society will be glad to confer with anyone contemplating the establishment of a memorial, and will also welcome an opportunity to discuss the Society's needs, now or in the future, which may be met either through current gifts or bequests.

. . . BEQUEST FORM . . .

I hereby give, devise and bequeath to the NATIONAL AUDUBON SOCIETY, in the City of New York, in the State of New York,

the sum of.....dollars (or otherwise describe the gift), to be used for the general purposes of said Society.

BACK NUMBERS WANTED

We shall appreciate having your unwanted copies of the following magazines returned to us:

May-June 1945	Mar-Apr. 1940
July-Aug. 1945	July-Aug. 1940
May-June 1944	Sept-Oct. 1940
Jan.-Feb. 1943	May-June 1939
Mar-Apr. 1943	Mar-Apr. 1938
May-June 1943	May-June 1938
Mar-Apr. 1942	Mar-Apr. 1937
Sept-Oct. 1942	Nov-Dec. 1937
All six issues of 1941	Mar-Apr. 1935
Jan-Feb. 1940	Mar-Apr. 1925

NATIONAL AUDUBON SOCIETY

BACK NUMBERS WANTED

Section II

The issues of Section II as noted below are out of stock. If you have copies which you do not want, we shall appreciate having them returned to this office.

Season Reports

Jan.-Feb. 1945	Mar.-Apr. 1942
May-June 1945	July-Aug. 1942
May-June 1944	Nov.-Dec. 1942
Nov.-Dec. 1944	Mar.-Apr. 1941
Mar.-Apr. 1943	May-June 1941
May-June 1943	July-Aug. 1941

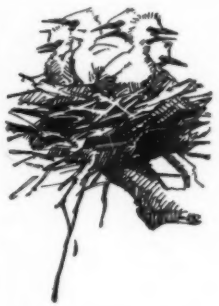
Breeding Bird Census

Sept.-Oct. 1944	Sept.-Oct. 1941
Sept.-Oct. 1942	Sept.-Oct. 1940

Christmas Count

Jan.-Feb. 1944	Jan.-Feb. 1942
Jan.-Feb. 1943	Jan.-Feb. 1941
Jan.-Feb. 1940	

NATIONAL AUDUBON SOCIETY



NESTING SEASON

AUDUBON FIELD NOTES

Published as Section II of *Audubon Magazine*, the September-October issue will contain an account of the breeding season of birds in vast areas of the country from the Atlantic to the Pacific. If you are not already doing so, send in your field notes to your regional editor so that his column will be even more complete. The schedule of publication is as follows:

Jan.-Feb.	Fall Migration
Mar.-Apr.	Christmas Count
May-June	Winter Season
July-Aug.	Spring Migration
Sept.-Oct.	Nesting Season
Nov.-Dec.	Breeding Bird Census

If you wish to receive Section II, send $1.00 extra with your subscription or membership. Membership includes the National Edition of *Audubon Magazine*, but does not include *Audubon Field Notes*.

FOR YOUR NATURE LIBRARY

CANADIAN NATURE MAGAZINE. This popular magazine presents in attractive form brief, interesting, up-to-date information on subjects in all the nature sciences, and contains questions and activity ideas, art work and projects for each season. It is written by authorities and illustrated by the best photographers and artists. *Canadian Nature* is issued in September, November, January, March and May. The five numbers contain approximately 200 pages, 90 articles, 35 colour plates, 160 photographs, 220 figure drawings. It was founded in 1939. The press run now exceeds 35,000 copies of each issue. By encouraging an intelligent interest in nature and emphasizing the need for conservation of our natural resources, this magazine is making a real contribution to individual and national character. Recommended by the American Association of School Librarians. Also approved by National Audubon Society; National Headquarters Boy Scouts of America; National Headquarters Girl Scouts Inc.; American Nature Study Society. It makes an ideal gift. It should be in every home, school and library. Subscriptions $1.25 a year.

NATURE ACTIVITIES. 50 cents. A practical, usable handbook for teachers, students, librarians, camp counsellors and all others actively interested in nature and conservation. The new edition of 64 pages and cover is simply brimming with hundreds of suggestions for the teaching of Natural Science. It contains chapters on the organization and leadership of indoor activities and field trips, the making of collections, exhibits and classroom museums, instructions for nature arts and handicrafts, and hundreds of definite activity suggestions, arranged seasonally week by week throughout the year. Profusely illustrated with photographs and 192 drawings. Since first published in 1943, six editions totalling 38,000 copies have been printed. Prompt service on mail orders.

WILD FLOWERS. $1.00. Contains fifteen beautiful reproductions in full colour of favourite wild flowers, painted for *Canadian Nature* by Barrie Rennie, noted Canadian artist. The subjects are: Skunk Cabbage, Trailing Arbutus, Hepatica, Dutchman's-breeches, Adder's-tongue, White Trillium, Jack-in-the-pulpit, Blue Violet, Showy Lady's Slipper, Yellow Lady's Slipper, Twin-flower, Bloodroot, Joe-pye Weed, Bunchberry and Bittersweet. When framed the pictures make ideal gifts or decorations. Each page is printed on one side only, so that single pictures may be conveniently detached. Seven editions totalling 22,000 copies have been printed.

CANADIAN BIRDS. 35 cents. Seventy-five birds in their typical environment. A fascinating panorama of native bird life by L. L. Snyder, Curator of Birds, Royal Ontario Museum of Zoology. Beautifully illustrated with pen and ink drawings by T. M. Shortt. Two editions totalling 8,000 copies have been printed. You will like this booklet!

CONSERVATION ILLUSTRATED. $1.00. This authoritative and important volume of 128 pages and cover presents a graphic picture of the natural resources of Canada, the part they have played in its development, the manner and consequences of their use—and misuse. Through stimulating reading, basic information, and approximately 200 photographs and drawings, *Conservation Illustrated* makes clear the imperative necessity for conserving forests, waters, soil and wildlife, and tells how this may be done. It has been prepared in collaboration with government officials, educators and conservationists in every province. Contains up-to-the-minute reference material, teaching suggestions, review questions and pupil activities. Every public-spirited person should send for this revealing volume.

NATIVE FERNS. $1.00. Our newest booklet! Read the fascinating story of liverworts, mosses, ferns and their kin. Virginia S. Eifert describes them and tells how they differ from other common plants; where to find them; their economic significance; how they grow and develop. You will be thrilled with the beauty of 73 photographs of ferns by Bruce Metcalfe. Many other illustrations and drawings. 64 pages and cover. Send copies to your friends.

MAIL TODAY

CANADIAN NATURE MAGAZINE, 177 Jarvis Street, Toronto 2, Canada

Fill my order as checked, at the prices listed:

- ☐ Canadian Nature.....1yr. $1.25
- ☐ Nature Activities.....1 copy 50¢
- ☐ Wild Flowers.....1 copy $1.00
- ☐ Canadian Birds.....1 copy 35¢
- ☐ Conservation Illustrated..... $1.00
- ☐ Native Ferns.....1 copy $1.00

My remittance in the amount of $_____ is enclosed.

NAME_____

ADDRESS_____

CITY AND STATE_____

AUDUBON

Living Memorials

THERE are few normal human beings who have not on occasion dreamed of a memorial which they would like to leave to posterity . . . sometimes in their own names, but more often to keep alive and to share with others the memory of a member of the family circle or of a friend.

GOOD fortune in the choice of such a memorial attends all those who have found pleasure in an understanding of nature, who have known and understood the birds of America, the creatures of the wild, and the great American outdoors. For they have an opportunity to reflect this interest by establishing a *living* memorial, which so long as life endures on this earth, will make its manifold contributions to all mankind.

THE program of the National Audubon Society presents a number of unusual opportunities for the establishment of such living memorials. The officers and directors of the National Audubon Society will be glad to confer with anyone contemplating the establishment of a memorial, and will also welcome an opportunity to discuss the Society's needs, now or in the future, which may be met either through current gifts or bequests.

. . . BEQUEST FORM . . .

I hereby give, devise and bequeath to the NATIONAL AUDUBON SOCIETY, in the City of New York, in the State of New York,

the sum of.....dollars (or otherwise describe the gift), to be used for the general purposes of said Society.

BACK NUMBERS WANTED

We shall appreciate having your unwanted copies of the following magazines returned to us:

May-June 1945	Mar-Apr. 1940
July-Aug. 1945	July-Aug. 1940
May-June 1944	Sept-Oct. 1940
Jan.-Feb. 1943	May-June 1939
Mar-Apr. 1943	Mar-Apr. 1938
May-June 1943	May-June 1938
Mar-Apr. 1942	Mar-Apr. 1937
Sept-Oct. 1942	Nov-Dec. 1937
All six issues of 1941	Mar-Apr. 1935
Jan-Feb. 1940	Mar-Apr. 1925

NATIONAL AUDUBON SOCIETY

BACK NUMBERS WANTED

Section II

The issues of Section II as noted below are out of stock. If you have copies which you do not want, we shall appreciate having them returned to this office.

Season Reports

Jan.-Feb. 1945	Mar. Apr. 1942
May-June 1945	July-Aug. 1942
May-June 1944	Nov.-Dec. 1942
Nov.-Dec. 1944	Mar.-Apr. 1941
Mar.-Apr. 1943	May-June 1941
May-June 1943	July-Aug. 1941

Breeding Bird Census

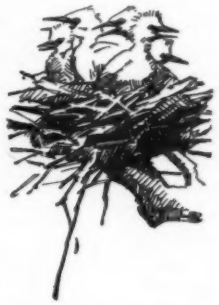
Sept.-Oct. 1944	Sept.-Oct. 1941
Sept.-Oct. 1942	Sept.-Oct. 1940

Christmas Count

Jan.-Feb. 1944	Jan.-Feb. 1942
Jan.-Feb. 1943	Jan.-Feb. 1941

Jan.-Feb. 1940

NATIONAL AUDUBON SOCIETY



NESTING SEASON

AUDUBON FIELD NOTES

Published as Section II of *Audubon Magazine*, the September-October issue will contain an account of the breeding season of birds in vast areas of the country from the Atlantic to the Pacific. If you are not already doing so, send in your field notes to your regional editor so that his column will be even more complete. The schedule of publication is as follows:

Jan.-Feb.	Fall Migration
Mar.-Apr.	Christmas Count
May-June	Winter Season
July-Aug.	Spring Migration
Sept.-Oct.	Nesting Season
Nov.-Dec.	Breeding Bird Census

If you wish to receive Section II, send $1.00 extra with your subscription or membership. Membership includes the National Edition of *Audubon Magazine*, but does not include *Audubon Field Notes*.

FOR YOUR NATURE LIBRARY

CANADIAN NATURE MAGAZINE. This popular magazine presents in attractive form brief, interesting, up-to-date information on subjects in all the nature sciences, and contains questions and activity ideas, art work and projects for each season. It is written by authorities and illustrated by the best photographers and artists. *Canadian Nature* is issued in September, November, January, March and May. The five numbers contain approximately 200 pages, 90 articles, 35 colour plates, 160 photographs, 220 figure drawings. It was founded in 1939. The press run now exceeds 35,000 copies of each issue. By encouraging an intelligent interest in nature and emphasizing the need for conservation of our natural resources, this magazine is making a real contribution to individual and national character. Recommended by the American Association of School Librarians. Also approved by National Audubon Society; National Headquarters Boy Scouts of America; National Headquarters Girl Scouts Inc.; American Nature Study Society. It makes an ideal gift. It should be in every home, school and library. Subscriptions $1.25 a year.

NATURE ACTIVITIES. 50 cents. A practical, usable handbook for teachers, students, librarians, camp counsellors and all others actively interested in nature and conservation. The new edition of 64 pages and cover is simply brimming with hundreds of suggestions for the teaching of Natural Science. It contains chapters on the organization and leadership of indoor activities and field trips, the making of collections, exhibits and classroom museums, instructions for nature arts and handicrafts, and hundreds of definite activity suggestions, arranged seasonally week by week throughout the year. Profusely illustrated with photographs and 192 drawings. Since first published in 1943, six editions totalling 38,000 copies have been printed. Prompt service on mail orders.

WILD FLOWERS. $1.00. Contains fifteen beautiful reproductions in full colour of favourite wild flowers, painted for *Canadian Nature* by Barrie Rennie, noted Canadian artist. The subjects are: Skunk Cabbage, Trailing Arbutus, Hepatica, Dutchman's-breeches, Adder's-tongue, White Trillium, Jack-in-the-pulpit, Blue Violet, Showy Lady's Slipper, Yellow Lady's Slipper, Twin-flower, Bloodroot, Joe-pye Weed, Bunchberry and Bittersweet. When framed the pictures make ideal gifts or decorations. Each page is printed on one side only, so that single pictures may be conveniently detached. Seven editions totalling 22,000 copies have been printed.

CANADIAN BIRDS. 35 cents. Seventy-five birds in their typical environment. A fascinating panorama of native bird life by L. L. Snyder, Curator of Birds, Royal Ontario Museum of Zoology. Beautifully illustrated with pen and ink drawings by T. M. Shortt. Two editions totalling 8,000 copies have been printed. You will like this booklet!

CONSERVATION ILLUSTRATED. $1.00. This authoritative and important volume of 128 pages and cover presents a graphic picture of the natural resources of Canada, the part they have played in its development, the manner and consequences of their use—and misuse. Through stimulating reading, basic information, and approximately 200 photographs and drawings, *Conservation Illustrated* makes clear the imperative necessity for conserving forests, waters, soil and wildlife, and tells how this may be done. It has been prepared in collaboration with government officials, educators and conservationists in every province. Contains up-to-the-minute reference material, teaching suggestions, review questions and pupil activities. Every public-spirited person should send for this revealing volume.

NATIVE FERNS. $1.00. Our newest booklet! Read the fascinating story of liverworts, mosses, ferns and their kin. Virginia S. Eifert describes them and tells how they differ from other common plants; where to find them; their economic significance; how they grow and develop. You will be thrilled with the beauty of 73 photographs of ferns by Bruce Metcalfe. Many other illustrations and drawings. 64 pages and cover. Send copies to your friends.

MAIL TODAY

CANADIAN NATURE MAGAZINE, 177 Jarvis Street, Toronto 2, Canada

Fill my order as checked, at the prices listed:

- ☐ Canadian Nature.....1yr. $1.25
- ☐ Nature Activities.....1 copy 50¢
- ☐ Wild Flowers.....1 copy $1.00
- ☐ Canadian Birds.....1 copy 35¢
- ☐ Conservation Illustrated..... $1.00
- ☐ Native Ferns.....1 copy $1.00

My remittance in the amount of $_____ is enclosed.

NAME_____

ADDRESS_____

CITY AND STATE_____

STATEMENT OF PURPOSES

The National Audubon Society

To arouse through education public recognition of the value of, and the need for protecting, wild birds and other animals, plants, soil and water, as well as of the interdependence of these several natural resources.

To study and conduct research with relation to the scientific facts, a knowledge of which is essential to the formulation of sound policies in the field of conservation.

To foster recognition of the need for the preservation of such environmental conditions as ample food, water and cover, on the maintenance of which animals and plants depend for survival.

To foster the preservation of an adequate stock of native animals and plants, so that no species may become threatened with extinction.

To promote the protection and preservation of natural resources, including the encouragement, establishment and maintenance of nature sanctuaries.

To publish and distribute documents, as a means of disseminating information about the subjects mentioned above or related matters.

To hold meetings, lectures and exhibitions, and to develop and maintain a library, in the interest of the conservation of natural resources.

To establish and maintain such educational projects as nature trails, museums, tours and camps.

To encourage the organization of branches and other affiliated groups in sympathy with these stated aims.

To cooperate, as occasion prompts, with national and state conservation agencies, and with private associations devoted to the interests of conservation and to education in the field of natural resources.

Mail to National Audubon Society, 1000 Fifth Avenue, New York 28, N. Y.

I desire to support the work of the NATIONAL AUDUBON SOCIETY through membership and enclose check for dues in the class checked.*

☐ **Regular $5** ☐ **Active $25** ☐ **Contributing $100**

☐ **Sustaining $10** ☐ **Supporting $50** ☐ **Life $200**

**Including AUDUBON MAGAZINE (National Edition), the official magazine of the Society*

(Membership fees and contributions to the National Audubon Society are deductible contributions on Federal Income Tax returns.)

NAME

ADDRESS